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62D CONGRESS
2d Session

HOUSE OF REPRESENTATIVES

DOCUMENT
No. 905

THE WATERS OF THE HOT SPRINGS OF ARKANSAS

IN RELATION TO THE ALLEVIATION AND CURE OF DISEASES

A REPORT OF THE
SECRETARY OF THE INTERIOR

ON

H. R. 24737 (62D CONGRESS, 2D SESSION), "A BILL TO AUTHORIZE THE INVESTIGATION OF THE PHYSIOLOGICAL AND THERAPEUTICAL EFFECTS OF THE WATERS OF THE HOT SPRINGS OF ARKANSAS AND TO REPORT UPON THE APPLICATION OF THESE WATERS TO THE ALLEVIATION AND CURE OF DISEASES."

WASHINGTON
GOVERNMENT PRINTING OFFICE
1912

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[Sixty-second Congress, Second Session.]

IN THE HOUSE OF REPRESENTATIVES,
August 10, 1912.

Resolved, That there be printed as a document five hundred copies of the report of the Secretary of the Interior, dated June seventh, nineteen hundred and twelve, and accompanying papers, on H. R. 24737, to authorize the investigation of the physiological and therapeutical effects of the waters of the hot springs of Arkansas, and to report upon the application of these waters to the alleviation and cure of diseases.

Attest:

SOUTH TRIMBLE, *Clerk.*

PHYSIOLOGICAL AND THERAPEUTICAL EFFECTS OF THE WATERS OF THE HOT SPRINGS OF ARKANSAS.

DEPARTMENT OF THE INTERIOR,
Washington, June 7, 1912.

Hon. JOSEPH T. ROBINSON,
Chairman Committee on the Public Lands,
House of Representatives.

DEAR SIR: Your letter of May 28 has been received, inclosing with request for report thereon H. R. 24737, "to authorize the investigation of the physiological and therapeutical effects of the waters of the hot springs of Arkansas and to report upon the application of these waters to the alleviation and cure of diseases." The bill in question is as follows:

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the sum of fifty thousand dollars, or so much thereof as may be necessary, be, and the same is hereby, appropriated to investigate the physiological and therapeutical effects of the waters of the hot springs of Arkansas and to report upon the application of these waters to the alleviation and cure of diseases, including the employment of all persons necessary in carrying on the work, the purchase of laboratory apparatus, equipment, and other supplies, the renting of building and other appurtenances, and all other expenses necessary to effectuate such investigation, to be expended under the supervision of the Secretary of the Interior and to continue available until expended.

SEC. 2. That the Secretaries of the Treasury, of the War, of the Navy, and of the Agricultural Departments, respectively, are hereby directed to cooperate with the Secretary of the Interior in such investigation, by detailing competent officers, and by extending all hospital, laboratory, and other facilities necessary and desirable in the carrying on of such investigation.

In response thereto I have to state that the minutes of the sixty-second annual session of the American Medical Association, Los Angeles session, June 26 to June 30, 1911, as published in the official journal of that organization, provides, among other things:

Proposal to examine radioactive waters.—Owing to the importance attributed to radioactive mineral waters in the treatment of gouty and other affections by competent European observers, and the special interest excited by the symposium on the subject at the Thirty-second Pharmacologic Congress recently held in Berlin, the section on pharmacology and therapeutics of the American Medical Association requests the house of delegates to suggest to the United States Government the advisability of investigating the radioactivity of the various mineral waters of the United States and publishing the result for the benefit of the medical profession.

Dr. Harry M. Hallock, medical director of the Hot Springs Reservation, under date of July 10, 1911, invited attention to the great and widespread faith in the curative properties of the water and to the recognition of the benefits to be derived from its use, as exemplified by the act of Congress in establishing the reservation of the Hot Springs, stating, among other things:

The intelligent application of any remedial agent, as distinguished from quackery, depends fundamentally upon definite knowledge as to the effects upon the living

organism which may be expected to follow its exhibition, and these have never been determined with reference to the water of the hot springs, at least in detail and with the scientific accuracy requisite for announcement to and acceptance by the medical world.

The relation of the Federal Government to the springs and the authority it exercises with reference to the prescribing of the water would appear to amount to a recommendation for its use in certain cases, and consequently it may be assumed that there devolves an obligation to determine, so far as may be possible, in what cases it is of real value, and how it influences the functions of the various organs of the body.

Subsequently, in February, 1912, the medical director was instructed to take up the subject of the investigation of the physiological effects of the waters from the hot springs and submit a report thereon; and there is herewith transmitted for your information a copy of his letter of April 19, 1912, embodying a detailed report on the subject, together with copies of letters received by him from the representatives of the leading medical colleges in the United States and members of the medical profession, expressing their views on the advisability of the inauguration of the investigation in question.

In the interest of the afflicted who resort to Hot Springs for the purpose of procuring the benefit of the thermal waters on the reservation it is highly desirable that experiments be inaugurated at the earliest practicable date to determine, as far as may be possible, the exact physiological action of the waters from these hot springs, and I have to recommend that the legislation contemplated in the bill receive early and favorable consideration.

Very respectfully,

CARMI A. THOMPSON,
Assistant Secretary.

DEPARTMENT OF THE INTERIOR,
HOT SPRINGS RESERVATION,
OFFICE OF MEDICAL DIRECTOR,
Hot Springs, Ark., July 10, 1911.

THE SECRETARY OF THE INTERIOR,
Washington, D. C.

SIR: I have the honor to recommend that a competent physiological chemist be employed to conduct a series of experiments with a view to determining, as far as may be possible, the exact physiological action of the water of the Hot Springs.

In this connection attention is invited to the great and widespread faith in the curative properties of the water and to the recognition of the benefits to be derived from its use, as exemplified by the act of Congress in establishing the reservation of the Hot Springs.

The intelligent application of any remedial agent, as distinguished from quackery, depends fundamentally upon definite knowledge as to the effects upon the living organism which may be expected to follow its exhibition, and these have never been determined with reference to the water of the Hot Springs, at least in detail and with the scientific accuracy requisite for announcement to and acceptance by the medical world.

The relation of the Federal Government to the springs, and the authority it exercises with reference to the prescribing of the water would appear to amount to a recommendation for its use in certain cases, and consequently it may be assumed that there devolves an

obligation to determine, so far as may be possible, in what cases it is of real value, and how it influences the functions of the various organs of the body.

Very respectfully, HARRY M. HALLOCK,
Medical Director.

[Extract from the report of the medical director of the Hot Springs Reservation for the year 1911.]

The physiological effects of the water have never been scientifically and accurately determined, and as its rational use can not be thoroughly understood in any other way it is recommended that a competent physiological chemist be employed to conduct a series of experiments in this direction.

DEPARTMENT OF THE INTERIOR,
HOT SPRINGS RESERVATION,
OFFICE OF MEDICAL DIRECTOR,
Hot Springs, Ark., April 19, 1912.

The SECRETARY OF THE INTERIOR,
Washington, D. C.

SIR: The letter from the department of February 14, 1912, with reference to the proposed investigation of the physiological effects of the water of the Hot Springs reads in part as follows:

I have to request that you will take up the subject with the other members of the Federal registration board and submit a general outline as to the amount of money which you think should be appropriated by Congress for this purpose, such appropriation to include compensation of physicians employed, laboratory facilities, appliances, and hospital facilities in connection with the matter.

In reply I have the honor to state that in compliance with the above instructions a circular letter, a copy of which is herewith inclosed and marked "A," was sent December 19, 1912, to the secretaries of a number of the leading medical colleges requesting that it be referred to an appropriate committee of the faculty and that said committee be requested to submit one or more names of persons qualified to undertake the work. Subsequently more detailed communications were sent to those recommended and March 18, 1912, another circular letter, a copy of which is inclosed herewith and marked "B," was sent to all the members of the American Association of Biological Chemists and to most of the professors of the practice of medicine and of materia medica and therapeutics in the class A medical colleges. All of the replies received to date are inclosed for the information of the department.

Consideration of this correspondence and of known facts would appear to justify the following conclusions:

1. Many representative nonresident practitioners view the therapeutic resources of hot springs with distrust because the physiological action of the water never has definitely and scientifically been determined by competent investigators uninfluenced by personal interests.

2. It is evident that there is a suspicion in the minds of some that the water of the hot springs has no curative properties not possessed by any water heated to the same temperature. If this be so the public and the medical profession are as much entitled to this information as to know what, if any, its distinctive therapeutic properties are. No other view can ethically be sustained.

3. The legitimate therapeutic value of the water and of the resort should be determined in order that those who are suffering from ailments that can be alleviated by treatment at the springs may know of that fact as well as that those who can not so be benefited may not be misled. The act of Congress which reserved and protected the water of the hot springs for the use of the people amounted to a positive and official declaration that it possesses unique and valuable therapeutic properties. In administering the affairs of the Hot Springs Reservation the Government is to all intents and purposes practicing medicine on an enormous scale in the sense that it sanctions and recommends to the people of the entire country the use of a particular remedial agent. Many thousands, having faith in the Government's indorsement, make use of this remedy each year, often coming from distant States at an expense that they can ill afford. Many unquestionably are greatly benefited; others would have been better off had they sought treatment elsewhere or remained at home. The Government is under much the same moral obligation to determine the pyhsiological effects of the remedy it sanctions and to safeguard and provide for its proper and successful administration as is the individual practitioner when he prescribes a drug.

4. The therapeutic value of radium is established, and the study of the physiological effects of natural radioactive spring waters is now occupying the attention of some of the foremost laboratory workers and clinicians of Germany.

5. There is a reasonable assurance that properly conducted investigations would afford definite scientific data of real and lasting value to the medical profession and through them to the people.

6. It is absolutely essential that the proposed investigations, to be of value and to warrant acceptance by the medical profession, should be exhaustive in scope and cover several allied fields of research. They should be conducted by a commission composed of the foremost men in their respective fields. Physicians having personal interests that might be influenced or that might influence them should not be appointed. It is very desirable to identify with the work the Carnegie and Rockefeller institutions for medical research, the Bureau of Chemistry of the Department of Agriculture, and the Public Health and Marine-Hospital Service.

7. The investigations of the commission should deal with the entire field of the application of the waters of the hot springs to the relief and cure of disease and not be confined merely to a study of its physiological effects. Under these conditions it is believed they might properly and advantageously express opinions and make recommendations covering all of the subject-matter included in the annual report of the medical director and thus greatly assist in the development of public sentiment for a satisfactory solution of many difficult problems. The report on the physiological action of the water could be rendered separately if desired and the other subjects, which are of almost equal importance to the welfare of patients, covered in a supplementary paper.

8. It is useless to attempt such work through any less thorough and far reaching investigations and without an adequate appropriation.

9. At least two years will be required for the work.

10. Whatever may be determined as to the specific curative properties of the water there can be no doubt but that there is ample justification for the maintenance of a resort of an essentially national character

at the springs. Should the commission determine definitely that the water is of therapeutic value, even in a restricted group of ailments, the importance of having that fact attested to the medical profession through the type of commission contemplated can scarcely be overestimated. Such a report would be accorded international circulation and text books on the practice of medicine would soon contain references to treatment at Hot Springs as they now indicate the class of cases suitable for "the cure" at Carlsbad or Nauheim.

It is impossible at the present time to prepare an accurate estimate for the necessary appropriation. By referring to the letters of Profs. L. B. Mendel and Victor Vaughan it will be seen there is a considerable variation in the figures given. The cost will vary greatly in accordance with the scope of the investigation and the personnel and number of the members of the commission, and can only be determined accurately after organization and the outlining of the work. Prof. Mendel suggests that it might be possible to induce desirable men to serve for an honorarium, traveling expenses and a per diem allowance. The cost will be materially lessened if the facilities of the Army and Navy General Hospital be obtained, if a laboratory can be established there, and if competent investigators can be detailed from the other Federal medical services. Much will depend upon the number of healthy individuals experimented upon or used as controls, as such men would have to be paid not less than a dollar a day plus subsistence and hospital accommodations.

Of the members of the Federal registration board, Drs. Dake and Steer are of the opinion that $100,000 will be required; Dr. Martin believes that $75,000 will suffice.

It is recommended that an effort be made to secure an appropriation of $50,000. This is believed to be a reasonable request in view of the importance of the work and will suffice to outline, inaugurate and pursue the investigations for a period of from one to two years. At the expiration of this time if satisfactory conclusions have not been reached there will undoubtedly be data available from which the advisability of requesting an additional appropriation can be determined.

The detailed estimate inclosed is as accurate as I have been able to prepare in view of the unusual character of the work. It provides for every necessary expenditure for the period of two years, the estimates for the first and second years being shown separately. There is attached to the estimate a bill for the desired appropriation.

Very respectfully,

HARRY M. HALLOCK,
Medical Director.

DEPARTMENT OF THE INTERIOR,
HOT SPRINGS RESERVATION,
OFFICE OF MEDICAL DIRECTOR,
Hot Springs, Ark., December 19, 1911.

The SECRETARY, UNIVERSITY OF COLUMBIA,
New York City.

DEAR SIR: The Secretary of the Interior has directed me to make due inquiry and ascertain if possible the name of some physiological chemist competent to conduct a series of experiments with a view to

determining, so far as may be practicable, the exact physiological effects of the water of the Hot Springs of Arkansas. These investigations should be made by one whose standing and qualifications are such that the findings will be accepted by the medical profession as reliable scientific research. I therefore beg to inquire if it would be practicable for you to refer this matter to an appropriate committee of the faculty with the request that they submit one or more names of persons qualified to undertake this work.

It has already been determined that there is no officer of the Medical Department of the Army, the Navy, or the Marine-Hospital Service available.

Thanking you for any assistance you may be able to render, I have the honor to remain,

Very respectfully, HARRY M. HALLOCK,
Medical Director.

A letter similar to the one attached was also sent to the following:
The secretary, Harvard University, Cambridge, Mass.
The secretary, University of Pennsylvania, Philadelphia, Pa.
The secretary, Johns Hopkins University, Baltimore, Md.
The secretary, Jefferson Medical College, Philadelphia, Pa.
The secretary, University of Chicago, Chicago, Ill.
Dr. Alexander R. Craig, secretary, the American Medical Association, Chicago, Ill.

Letters received from representatives of leading medical colleges and members of the medical profession in relation to proposed investigation of the physiological and therapeutic effects of the waters of the hot springs of Arkansas.

THE UNIVERSITY OF CHICAGO, *January 31, 1912.*

Dr. HARRY M. HALLOCK,
Medical Director, Hot Springs, Ark.

DEAR SIR: Your letter of the 19th ultimo, asking the names of one or more persons qualified to investigate the action of the waters of the hot springs and directed to the secretary of this university, has been referred to me.

I would suggest the names of the following physiologists who would be qualified to undertake the work you mention:

1. Dr. Ralph S. Lillie, department of zoology, University of Pennsylvania.

2. Prof. E. P. Lyon, professor of physiology, St. Louis University, St. Louis, Mo.

3. Prof. Waldemar Koch, assistant professor of pharmacology, of this university.

4. Prof. Abel or Howell of Johns Hopkins University, Baltimore, Md.

There are many other names which might be given, but these occur to me as men of ability who have worked along these lines.

Very truly, yours,

ALBERT P. MATHEWS.

JOHNS HOPKINS UNIVERSITY,
DEPARTMENT OF PHARMACOLOGY,
Baltimore, December 29, 1911.

Dr. HARRY M. HALLOCK,
Medical Director, Department of the Interior,
Hot Springs Reservation, Hot Springs, Ark.

DEAR SIR: Your letter of recent date in reference to a physiological chemist has been referred by the registrar to me. I would suggest that you apply to the council on pharmacy and chemistry of the American Medical Association, 535 Dearborn Avenue, Chicago, Ill., for assistance in this matter. You will be almost sure to learn from them of someone who can do this work for you.

Very truly, yours,

JOHN J. ABEL.

JOHNS HOPKINS UNIVERSITY,
DEPARTMENT OF PHYSIOLOGY,
Baltimore, Md., February 26, 1912.

Dr. HARRY M. HALLOCK,
Medical Director, Hot Springs, Ark.

DEAR SIR: I beg to acknowledge the receipt of your letter of February 20, in regard to the investigation of the physiological action of the waters of the hot springs. As your letter was directed to Prof. Abel W. Howell, I am a little uncertain whether it was meant for my colleague Prof. J. J. Abel or for myself. For myself I can only say that it would scarcely be possible for me to leave my work to engage in such an investigation. It would seem to me that if adequate facilities can be obtained such an investigation might yield very interesting and possibly practically valuable results. If I were directing the work I should want to make a preliminary investigation upon animals—dogs or rabbits—since naturally in some respects this would enable the experimentor to control his results more satisfactorily. Such results as were obtained could then be studied by way of corroboration upon man. The action of the water ought to be studied upon the general metabolism, the respiratory exchange, heat production (calorimetric), blood and circulation, reactions of the nervous system, excretion, etc.

If you could obtain his services, Prof. Mendel (L. B. Mendel), Yale University, New Haven, Conn., would probably be the best qualified man. If he can not accept such work himself he may be able to designate a younger man who will carry out experiments under his directions.

Very truly, yours,

W. H. HOWELL.

DEPARTMENT OF THE INTERIOR,
HOT SPRINGS RESERVATION,
OFFICE OF MEDICAL DIRECTOR,
Hot Springs, Ark., February 29, 1912.

Prof. L. B. MENDEL,
Yale University, New Haven, Conn.

SIR: There is under consideration by the Secretary of the Interior the advisability of conducting a series of experiments to determine the physiological effects of water of the hot springs of Arkansas.

Over 100,000 people visit this resort each year and the therapeutic value of the baths in certain conditions is well established. It is believed that an appropriation by Congress can be obtained to carry on these experiments and it is thought that a physiological chemist working in conjunction with a commission consisting of the medical director of the Hot Springs Reservation, the Federal board of medical examiners and possibly one or two delegates from the County Medical Society would be able to thoroughly study and scientifically investigate both the therapeutic and the physiological effects and to place before the medical profession experimental data of value.

It is believed that the cooperation of the Secretary of War, the Secretary of the Navy, and the Public Health and Marine-Hospital Service can be secured as well as the facilities of the Army and Navy General Hospital. The work would probably extend over at least a year and possibly longer.

Your name has been suggested as one eminently competent in the research field and I therefore beg to inquire as to whether in your opinion it would be possible to obtain results from this line of work that would be of real value to the medical profession and commensurate with the expenditure involved.

Would you be willing to accept such an appointment if it were formally tendered to you and at what compensation? Could you give an estimate of the probable total cost including your own compensation, that of all necessary apparatus and supplies, the employment of subjects for experiments in the study of blood and excretory changes, etc., covering the work of the commission for the period of one year?

There are enclosed for your information certain papers and reports that it is believed may be of interest in connection with the subject.

Very respectfully,

HARRY M. HALLOCK,
Medical Director.

A copy of the attached letter was also sent to the following:

Prof. E. P. Lyon, professor of physiology, St. Louis University, St. Louis, Mo.

Prof. Waldemar Koch, assistant professor of pharmacology, University of Chicago, Chicago, Ill.

Prof. Abel W. Howell, Johns Hopkins University, Baltimore, Md.

Dr. Ralph S. Little, department of zoology, University of Pennsylvania, Philadelphia, Pa.

Prof. Jacob Rosenbloom, College of Physicians and Surgeons, 437 West Fifty-ninth Street, New York City, N. Y.

Prof. Victor Vaughan, M. D., University of Michigan, Ann Arbor, Mich.

Prof. A. E. Taylor, Medical School, University of Pennsylvania, Philadelphia, Pa.

SHEFFIELD LABORATORY PHYSIOLOGICAL CHEMISTRY,
YALE UNIVERSITY,
New Haven, Conn., March 6, 1912.

Dr. HARRY M. HALLOCK,
Hot Springs Reservation, Hot Springs, Ark.

MY DEAR SIR: I desire to acknowledge the receipt of your letter of February 29, with reference to the possibility of a series of experiments to determine the physiological effects of the waters of the hot springs.

In view of the importance and scope of the questions raised in your communication, it will be necessary for me to delay a formal and definite reply until I can consider with some care the problems which are involved therein. Any investigation along the lines outlined by you will call for careful and exhaustive studies in several related fields; and in order to give you some facts and opinions which are likely to be of any value to you I must ask for a brief time in which to give questions at issue and the probability of useful outcome to research more careful consideration. I assume, from statements in the documents which you forwarded to me, that at the present time the unique therapeutic properties of the spring waters are in good part ascribed to radio-active manifestations. These are, as you well know, being widely investigated in some of the foremost laboratories of Europe.

Very respectfully,

LAFAYETTE B. MENDEL.

DEPARTMENT OF THE INTERIOR,
HOT SPRINGS RESERVATION,
OFFICE OF MEDICAL DIRECTOR,
Hot Springs, Ark., March 12, 1912.

Prof. LAFAYETTE B. MENDAL,
Sheffield Laboratory of Physiological Chemistry,
Yale University, New Haven, Conn.

MY DEAR SIR: I beg to acknowledge your letter of March 6 in reply to mine of February 29, 1912, and thank you sincerely for the interest and attention you have given the matter. Should the investigations be undertaken it will doubtless take some time to arrange the details, but there is one point that it is greatly desired to have settled at once and that is the determination of the sum to be requested from Congress for carrying on the work. This must be determined by April 1 in order to have the bill presented during the present session.

I am in receipt of a letter from the department which reads in part as follows:

> I have to request that you will take up the subject with the other members of the Federal registration board and submit a general outline as to the amount of money which you think should be appropriated by Congress for this purpose, and such appropriation to include compensation of physicians employed, laboratory facilities, appliances, and hospital facilities in connection with the matter.
>
> In submitting the estimate of the amount to be appropriated for this purpose a lump sum will be asked for, out of which all necessary expenses, including compensation of experts, etc., is to be paid, and it is also proposed to suggest to Congress that the Secretary of War, the Secretary of the Navy, and the Public Health and the Marine-Hospital Service, be authorized to cooperate with this department in handling the subject, the entire matter to be under the supervision of the Secretary of the Interior.

It would be of material assistance if you would be willing to give at least an approximate estimate as to the necessary expenditures basing the figures on the work of such a commission for the first year, and also if you could express an opinion as to the number of years that would be required to complete the work.

It is believed that hospital facilities can be obtained at the Army nd Navy General Hospital without cost other than the subsistence

of patients. Information is especially desired as to the probable cost of the following items:

Compensation of expert.

Compensation of assistant.

Chemical laboratory equipment and operation (exclusive of building).

Number and cost of animals used for experimental purposes.

Number of healthy subjects to be employed for experimental purposes.

Number of patients to be observed.

Thanking you for any assistance you may be able to render, I am,

Very truly, yours,

HARRY M. HALLOCK,
Medical Director.

SHEFFIELD LABORATORY OF
PHYSIOLOGICAL CHEMISTRY, YALE UNIVERSITY,
New Haven, Conn., March 18, 1912.

Dr. HARRY M. HALLOCK,
Medical Director, Hot Springs Reservation,
Hot Springs, Ark.

MY DEAR SIR: I desire herewith to reply to your letters of February 29, and March 12, in regard to the advisability of undertaking a series of investigations upon the therapeutic and physiological effects of the baths at the Hot Springs Reservation. Several distinct questions raised in your communications must be answered independently.

In considering the probable value of any further elaborate research on the physiological effects of the waters it must be borne in mind that there already exists an enormous literature on balneotheraphy. The Government circular which accompanied the documents sent to me states that "the therapeutic value of the baths is dependent upon the radioactivity of the waters." This aspect of the subject has been under consideration in very recent years only. The observations on the physiological and therapeutic effects of radium emanation which have lately been reported by competent observers, e. g., from the clinics of His in Berlin and Von Noorden in Vienna, encourage the belief that there is a useful field of investigation in this direction which deserves careful and speedy attention. In justification for this statement I may quote from a recent communication from Prof. von Noorden and Dr. Falta in Vienna:

Die Emanationskuren haben einen mächtigen Einfluss auf wichtige Stoffwechselprozesse und auf den Erregungszustand des vegetativen Nervensystems und erfordern ebenso wie die Behandlung mit Kohlensäurebädern und andere Bade- oder Trinkkuren volle Hingabe an die Anforderungen der Kur. Es scheint ratsam, die Emanatorien hauptsächlich in Kurorten, Spitälern und Sanatorien zu errichten, wo die Patienten aus der Berufsarbeit ausgeschaltet sind. Naturgemass werden hierfür solche Kurorte die günstigsten Verhältnisse darbieten, wo auch natürliche Radiumbäder zur Verfügung stehen.

Emanation cures have a powerful influence on important processes of metabolism and on the excitability of the living nervous system and require, the same as treatment with carbonic acid and other bathing and drinking cures, a complete compliance with the requirements of the treatment.

It appears advisable to establish emanation cures principally in bathing resorts, hospitals, and sanitoria, where the paitents are removed from the usual work of their respective occupations.

Naturally the most favorable conditions will be afforded by bathing resorts where natural radium baths are also available. (Translation of German quotation.)

I have no specific information at hand regarding the actual composition of the hot springs water; but if their radioactive properties are of sufficient significance to warrant scientific exploitation in the form here indicated, a careful and responsible investigation along the lines proposed is, in my judgment, both desirable and timely.

With respect to the conduct of such an investigation I am convinced that the cooperation of a number of men in different departments of research whose fitness in respect to both training and ability is widely recognized, would alone give any report the prominence and authority which is desired. No investigation will be worth while which fails to carry with it the stamp of scientific excellence and critique. In view of the circumstances involved it seems to me most practicable to have the responsibility for the plan and general execution of such an investigation invested in a commission. The latter should include men of acknowledged capacity in medical fields and the underlying sciences, both clinicians and physiologists (which of course includes the physiological chemist) who could not only broadly direct the scope of the work, but what is equally important could competently criticize and evaluate the data. The general objection to a commission constituted of delegates from county medical societies, etc., as indicated in your letter of February 29, lies in the unfitness of such individuals, as a rule, to contribute in any peculiarly useful or expert way to the real duties of such a commission. Their work is likely to be perfunctory, subject to the bias of local traditions or the influence of important home interests. It might also be difficult to induce first-class investigators to work under the direction of an unsympathetic board. A further highly advantageous feature of the commission system constituted of several competent scientists is the presumable elimination of the danger of errors from the judgment of single individuals. We have suffered enough in this country from such one-man pronouncements. Much useless and uncalled for work has been done in the name of science and under authoritative sanction owing to the elimination of critical review by competent colleagues.

The cost of a comprehensive investigation along the lines suggested will, of course, depend on its scope and on the personnel of the commission. Having in mind the necessary laboratory facilities and equipment, a number of laboratory workers (chemists, assistants, and helpers), eight or ten subjects, and their maintenance, and experimental animals, I estimate an outlay of at least $1,500 per month in this direction. To this should be added an initial cost of establishing a laboratory outfit. In Hot Springs (where no such outfit is now available) this ought not to exceed $2,000. To complete the budget for the first year the salary of a supervising physiological chemist must be added. It will be impossible to deflect anyone of the experience and rank of assistant professor in our universities to such work at a salary less than $3,000 per year. This would seem to me to represent the type of man to cooperate with the commission as proposed in my suggestion. A scientist of higher professional rating and ability ought to command a higher income for obvious reasons.

An expenditure of about $25,000 for the first year is thus provided for. The estimates are based on my experience in such matters in larger researches in our laboratory, on the published budgets of the Carnegie Institution nutrition investigations, and on the experiences of the Referee Board of Consulting Scientific Experts of the United States Department of Agriculture. It must be borne in mind that there are no opportunities at Hot Springs to use the equipment of established research plants, such as universities. The cost of research may thus be raised. Such an investigation ought to give valuable indications within two years. From the standpoint of therapeutic evidence a longer collection of statistical data might be desirable.

In considering the make-up of a commission of three (or five) members in addition to the supervising physiological chemist and the medical director, I am inclined to believe that desirable individuals can be induced to serve from a sense of public duty and scientific interest, without what might strictly be termed a salary. Such individuals should, of course, receive compensation for traveling expenses, or similar outlay, together with a modest honorarium in proportion to the time required of them. The outlay thus involved is not taken into consideration in the above estimate because the amount involved will depend entirely on the plan followed. It may be noted that highly competent investigators, such as Prof. Reid Hunt of the Hygienic Laboratory of Washington, might be directly available through the cooperation of the Public Health and Marine-Hospital Service.

Will the results be commensurate with the expenditure involved? The answer depends on the mental attitude of those who expect the reply. If a group of foremost American citizens, whose experience and judgment is attested by their position, do not hesitate to authorize the expenditure of half a million dollars for astronomical research in one institution alone, and when successful American firms feel justified in expending $4,000 for a single page advertisement of an article of uncertain merit, shall we debate the question asked?

Finally, in reply to your tentative inquiry as to whether I would be willing to accept the appointment as physiological chemist, if it were formally tendered, I may say that my academic and research preferences and duties at present are such that I would not care to do so. If an occasion should arise in which I might be of service in some less direct way than through resident activity in Hot Springs—more specifically if I might be desired to cooperate in some advisory function—my readiness to serve might be considered.

Respectfully,

LAFAYETTE B. MENDEL.

P. S.—If a personal interview would be helpful to you in any way while you are making the preliminary plans I shall be glad to have you or other representatives meet me here or in some convenient place.

L. B. M.

DEPARTMENT OF THE INTERIOR,
HOT SPRINGS RESERVATION,
OFFICE OF MEDICAL DIRECTOR,
Hot Springs, Ark., March 25, 1912.

Prof. LAFAYETTE B. MENDEL,
Sheffield Laboratory of Physiological Chemistry,
Yale University, New Haven, Conn.

DEAR PROF. MENDEL: I beg to acknowledge your letter of March 18, 1912, and desire to express my deep appreciation of the very careful consideration you have given to my inquiries.

All of the correspondence with reference to the proposed investigations will be forwarded to the Secretary of the Interior in due time and I am sure that the officials of the department in Washington will appreciate your courtesy as much as I do.

Very respectfully,

HARRY M. HALLOCK,
Medical Director.

DEPARTMENT OF THE INTERIOR,
HOT SPRINGS RESERVATION,
OFFICE OF MEDICAL DIRECTOR,
Hot Springs, Ark., February 8, 1912.

The SECRETARY OF THE INTERIOR,
Washington, D. C.

SIR: July 10, 1911, recommendation was made by this office that provision be made for a complete study of the physiological effects of the water of the hot springs. By letter from the department of December 6, 1911, I was instructed to "make due inquiry and ascertain if possible the name of some competent person to do this work and the compensation he would be willing to accept therefor." December 19, 1911, a circular letter was addressed to the secretary of the American Medical Association and to the secretaries of the leading medical colleges of the country outlining in a general way the proposed investigations and requesting the nomination, in each instance, by an appropriate committee of the faculty, of a biological chemist of recognized standing and ability. February 20, 1912, a circular letter was sent to each of the physiological chemists, recommended by the committees of the faculties referred to, giving a more detailed outline of the general proposition, requesting an expression of opinion as to the advisability of undertaking the study and an estimate of the cost. Only a few replies have been received so far. The general plan, however, is indorsed by Prof. Otto Folin of Harvard University, Prof. Victor Vaughan of the University of Michigan, Prof. A. E. Taylor of the University of Pennsylvania, and Prof. Ralph S. Lillie of the University of Pennsylvania. The secretary of the American Medical Association has expressed much interest and referred the letter to the council on therapeutic research. Prof. Otto Folin has furnished me with a list of the members of the American Society of Biological Chemists.

The proposed undertaking is one of considerable magnitude. Such a series of investigations would require at least a year and quite possibly two or three years. A chemical analysis of the water is a simple

proposition. The study of the physiological effects involving obscure changes in the metabolism of the living body is an extremely difficult problem. It is quite within the bounds of possibility that definite results could not be obtained. It therefore appears desirable to obtain an expression of opinion from a considerable number of competent men as to the advisability of undertaking the work and the probability of its yielding scientific data that will be of real value to the medical profession and through them to suffering humanity. It is also believed that as full indorsement of the plan should be secured as possible in connection with the effort to secure from Congress the necessary appropriation.

I have accordingly prepared a circular letter, a copy of which is inclosed with the intention, if it meets with the approval of the department, of forwarding a copy to every member of the American Society of Biological Chemists and to the professors who are occupying the chairs of the practice of medicine and of therapeutics and materia medica in the class A medical colleges These are the men who are most directly in touch with the problems involved and with clinical medicine. It is believed that this plan wi l bring a sufficient number of replies rom competent sources to settle definitely any possible question as to the advisability of undertaking the work.

As it is impracticable with the clerical assistance available to promptly conduct the correspondence involved, I have the honor to request that the department have the circular letter multigraphed and that I be furnished, for inclosure, copies of the circular of general information and the medical director's annual report.

The number of each required is as follows:

Circular letter multigraphed	200
Medical director's annual report	200
Circular of general information	200

There has been forwarded to the department, under separate cover, 225 letter heads for the multigraphed letter.

Very respectfully,

HARRY M. HALLOCK,
Medical Director.

DEPARTMENT OF THE INTERIOR,
HOT SPRINGS RESERVATION,
OFFICE OF MEDICAL DIRECTOR,
Hot Springs, Ark., ——— —.

SIR: The Secretary of the Interior is considering the advisability of conducting a series of experiments for the purpose of determining the physiological effects of the water of the hot springs of Arkansas. The faith of the laity in its remedial and curative properties is well established, and a steadily increasing number come to the springs each year for treatment. There are now upward of 100,000 visitors annually. Through the establishment of the office of the medical director there is now direct medical supervision over the administration of the baths and an earnest effort is being made by the Federal Government to place the medical service on a high ethical plane. As part of this general policy it is thought that a study of the physiological effects of the water is of first importance.

A complete chemical examination has been made by Prof. J. K. Haywood of the Bureau of Chemistry of the Department of Agriculture and by Prof. Walter Harvey Weed of the United States Geological Survey. In 1905 the department secured the services of Prof. B. B. Boltwood and Prof. Joseph Hyde Pratt for further analysis. Their report contains the following conclusions:

(1) The waters of the springs on the Hot Springs Reservation are all radioactive to a marked degree.
(2) The radioactivity of the waters is due to dissolved radium emanation (a gas) and not to the presence of salts of radium or other radioactive solids.
(3) The tufa deposited by the springs does not contain appreciable traces of radium.

A letter has been received from the secretary of the council on pharmacy and chemistry of the American Medical Association stating that the council's committee on therapeutic research has been planning to secure the cooperation of scientists for a thorough study of the therapeutic value of mineral waters, and it is also noted that at the sixty-second annual session of the American Medical Association held at Los Angeles June 26 to 30, 1911, the following resolution was passed:

Owing to the importance attributed to radioactive mineral waters in the treatment of gouty and other affections by competent European observers and the special interest excited by the symposium on the subject at the Thirty-second Balneologic Congress recently held in Berlin, the section on pharmacology and therapeutics of the American Medical Association requests the House of Delegates to suggest to the United States Government the advisability of investigating the radioactivity of the various mineral waters of the United States and publishing the results for the benefit of the medical profession.

The arrangement contemplated by the Secretary of the Interior includes the securing of the services of a competent physiological chemist to work in conjunction with a commission of medical men. It is thought that investigations would extend over one and possibly over several years. It is believed that an appropriation from Congress can be obtained for the purpose and that the cooperation of the Medical Departments of the Army, of the Navy, and of the Marine-Hospital Service can be had, together with the facilities of the Army and Navy General Hospital at Hot Springs.

It is not desired to enter this field for commercial exploitation but to determine the legitimate therapeutic value of the water, and to secure the respect and support of the medical profession with a view to the development in our own country of a spa that will compare favorably with resorts of like character abroad.

Before requesting an appropriation from Congress for this work it is desired to obtain from competent sources an expression of opinion as to whether there is a reasonable probability that a series of biochemical investigations conducted by competent observers upon animals and upon human beings, both the sick and the well, would yield results that would be of value to the medical profession and through them to suffering humanity. In other words, is the subject a legitimate and proper one for scientific research from the standpoint of clinical medicine.

There are inclosed for your information certain reports and papers relative to the subject, and it is hoped you will favor the department with an expression of your opinion. Should you advise that the

work be undertaken, any recommendations you may be willing to submit as to the best method of procedure will be carefully considered.

Thanking you for any assistance that you may be able to render, I beg to remain,

Very truly, yours,

HARRY M. HALLOCK,
Medical Director.

THE UNIVERSITY OF ILLINOIS,
Urbana, Ill., March 21, 1912.

DR. HARRY HALLOCK.
Medical Director, Hot Springs Reservation,
Hot Springs, Ark.

MY DEAR DR. HALLOCK: Your communication concerning the proposition to ask Congress for an appropriation to cover the expense of an exhaustive investigation into the physiological effect of the hot springs water has just reached me.

A thoroughly scientific study of a far-reaching character of this most important topic would without doubt yield data of immense importance to the physical welfare of the citizens of our own and other countries. I was extremely gratified when the American Medical Association in session at Los Angeles passed the resolution to which reference is made in your letter.

The pronounced benefits to be derived from the proper use of water both externally and internally have not been fully appreciated by the medical fraternity, to say nothing of the laity. For a period of two to three years we have been devoting considerable time to the question of physiological effect of ingested water. Under separate cover I am sending you reprints of some of our publications. According to our data the free use of water with meals or between meals is of great benefit to the human organism from every standpoint investigated. We have also been interested in the physiological effect of baths but have been unable to investigate the subject because of the fact that the investigations on water drinking and on fasting have demanded the major portion of the energy of myself and staff. In connection with one of our studies we made a short superficial study of hot baths, using two normal men as subjects. The data are not yet in form for publication.

I trust that you may be successful in convincing Congress of the very great need for an extended series of investigations such as you propose. I say "extended" advisedly for you will most certainly need to investigate a large number of cases both normal and clinical over a considerable period of time before you will feel warranted in announcing your final conclusions. Work of this character to meet the approval of the scientific world must of necessity be done by men of proven ability. The experimental staff would of necessity be large in order to properly conduct an investigation of that character. It is my belief that a staff of 10 to 15 men with scientific or medical training would be required to investigate such a problem from all sides, e. g., clinical, bacteriological, pathological, chemical, biochemical, and physiological.

I have outlined no definite plan of procedure but have simply attempted to impress one or two matters of prime importance in the preliminary organization of such an extensive study as is proposed. My personal scientific and research interests have always occupied channels such as must of necessity be followed by your hot springs investigation and for that reason it will give me great pleasure to be of any possible assistance to you in your attempt to interest Congress in this most worthy and humane proposition.

Very sincerely,

P. B. HAWK,
Professor of Physiological Chemistry.

AMERICAN MEDICAL ASSOCIATION,
COUNCIL ON PHARMACY AND CHEMISTRY,
Chicago, December 23, 1911.

Maj. H. M. HALLOCK,
Medical Director, Hot Springs Reservation,
Hot Springs, Ark.

DEAR SIR: Dr. A. R. Craig, secretary of the American Medical Association, has referred your letter of December 19 to me. I am submitting your inquiry to the council and it will receive very careful consideration.

It may interest you to know that the council's committee on therapeutic research has been planning to secure the cooperation of scientists for a thorough study of the therapeutic value of mineral waters.

Yours, truly,

W. A. PUCKNER, *Secretary.*

AMERICAN MEDICAL ASSOCIATION,
COUNCIL ON PHARMACY AND CHEMISTRY,
Chicago, January 19, 1912.

Maj. H. M. HALLOCK,
Medical Director, Hot Springs Reservation,
Hot Springs, Ark.

DEAR SIR: Your letter of December 19 having been referred to the council's committee on therapeutic research, the chairman, Dr. Torald Sollmann, asked me to reply that it would appear impossible to make any suggestions to you until more definite information is available regarding the intended scope of the investigation. He believes that it is doubtful that the physiological effects of the waters could be determined by one individual—certainly not by a physiological chemist. It is Dr. Sollmann's opinion that it would probably require a commission working through a series of experiments extending over some years.

If the council or its research committee can give you any further aid it will be glad to do so.

Yours, truly, W. A. PUCKNER, *Secretary.*

DEPARTMENT OF THE INTERIOR,
HOT SPRINGS RESERVATION,
OFFICE OF MEDICAL DIRECTOR,
Hot Springs, Ark., February 20, 1912.

Mr. W. A. PUCKNER,
Secretary American Medical Association,
Chicago, Ill.

DEAR SIR: Replying to your letter of January 19, 1912, in answer to my inquiry of December 19, 1911, on the subject of the determination of the physiological effects of the waters of the hot springs of Arkansas, you state—

> Dr. Torald Sollman asked me to reply that it would appear impossible to make any suggestions to you until more definite information is available regarding the intended scope of the investigation. He believes that it is doubtful that the physiological effects of the waters could be determined by one individual—certainly not by a physiological chemist. It is Dr. Sollmann's opinion that it would probably require a commission working through a series of experiments extending over some years.
>
> If the council or its research committee can give you any further aid, it will be glad to do so.

The therapeutic value of the springs in certain conditions appears to be well established by popular concensus of opinion of the many who have been benefited and by physicians who have had an opportunity to observe the effects of the use of the water. Heretofore commercialism has had an undue influence in local conditions and in the administration of the baths. Direct medical supervision was established September, 1910, by the creation of the office of medical director, and an effort is now being made to develop, along legitimate and ethical lines, whatever therapeutic resources are inherent in the waters and in the resort.

It is believed that an appropriation can be obtained from Congress for the purpose of conducting a series of experiments to determine the physiological effect of the water, and that such work could be undertaken by a commission consisting of a physiological chemist, the medical director of the reservation, the Federal registration board, all of whom are practicing physicians familiar with the use of the waters, and possibly one or more members of the county medical society. It is thought that the facilities of the Army and Navy general hospital could be obtained and possibly the cooperation of members of the medical departments of the Army and Navy, and of the Marine-Hospital and Public-Health Service. It is assumed that the work would extend over a considerable period.

The most important point to determine at present is whether it is worth while to undertake this work; whether there is a reasonable probability that a study of the blood, the excretions, etc., in health and in disease, would give data as to the physiological effects and indications for the administration of the water that would be of value of the medical profession of the country and through them to suffering humanity.

There are inclosed certain reports and papers that have some bearing on the subject, and if the council or its research committee would be willing to express an opinion as to the advisability of attempting this research along the lines suggested, or on any modifications of them, their action, opinion, or recommendation would be valued highly and most carefully considered.

Very respectfully,

HARRY M. HALLOCK,
Medical Director.

AMERICAN MEDICAL ASSOCIATION,
COUNCIL ON PHARMACY AND CHEMISTRY,
Chicago, February 23, 1912.

DR. H. M. HALLOCK,
Hot Springs Reservation,
Hot Springs, Ark.

DEAR DR. HALLOCK: I have received your letter of February 20 and shall transmit it to the council.

Personally, I am very much interested in the proposed investigation and I hope that the council may be of some aid in solving the problems. I will write you further as soon as the matter has received consideration.

Yours, truly,

W. A. PUCKNER,
Secretary.

HARVARD UNIVERSITY,
Cambridge, Mass., December 22, 1911.

MY DEAR SIR: Your letter of December 19, in regard to a physiological chemist to conduct some experiments with the water of the hot springs of Arkansas, has been received.

I am referring it to the secretary of the Harvard Medical School, Dr. Channing Frothingham, jr., who will, I hope, be able to recommend to you a competent man for the work.

Sincerely, yours,

E. H. WELLS.

HARRY M. HALLOCK, M. D.

HARVARD UNIVERSITY MEDICAL SCHOOL,
Boston, Mass., December 27, 1911.

DR. HARRY M. HALLOCK.

DEAR MR. HALLOCK: Your letter of December 19 is at hand, and I have referred it to Prof. Otto Folin, our professor of biological chemistry. I feel sure that he will be able to suggest some one to you if there is anyone available around this part of the country.

Very truly, yours,

C. FROTHINGHAM, Jr.,
Secretary.

DEPARTMENT OF BIOLOGICAL CHEMISTRY,
HARVARD MEDICAL SCHOOL,
Boston, January 2, 1912.

DR. HARRY M. HALLOCK,
Hot Springs, Ark.

DEAR SIR: Your letter to Harvard University regarding a biochemical investigation of the physiological effect of the hot springs water has been referred to me for an answer. In my opinion it is not possible to determine the "exact physiological effects" of that water with any such degree of certainty as to meet with general and unqualified acceptance. An investigation of the kind referre to

would be very expensive and in the hands of a properly qualified and conscientious expert might yield practically negative or at least very doubtful results.

If you, after reading these comments, still believe that your department is justified in having this work done and will let me know, I will send you a list of the best men in the country qualified in the field involved.

Very truly, yours, OTTO FOLIN.

DEPARTMENT OF THE INTERIOR,
HOT SPRINGS RESERVATION,
OFFICE OF MEDICAL DIRECTOR,
Hot Springs, Ark., February 21, 1912.

Prof. OTTO FOLIN,
Harvard Medical School,
Boston, Mass.

SIR: I beg to acknowledge and thank you for your letter of January 2, 1912, with reference to the determination of the physiological effects of the water of the hot springs of Arkansas. In it you state:

> In my opinion it is not possible to determine the "exact physiological effects" of that water with any such degree of certainty as to meet with general and unqualified acceptance. An investigation of the kind referred to would be very expensive and in the hands of a properly qualified and conscientious expert might yield practically negative or at least very doubtful results.
>
> If you, after reading these comments, still believe that your department is justified in having this work done, and will let me know, I will send you a list of the best men in the country qualified in the field involved.

The therapeutic value of the baths in certain conditions appears to be well established. The faith of the laity in the curative properties of the water has steadily increased despite the unfavorable local conditions of the past, and many physicians believe that this resort is destined to become one of the great spas of the world. Before the creation of the office of medical director the medical features of the service were largely overshadowed by the commercial spirit. An earnest effort is now being made to place the treatment of patients and the administration of the baths on a high ethical plane and in developing the medical service it was thought that a study of the physiological effects of the waters should be undertaken.

A part of the general plan was to secure the services of an expert physiological chemist to conduct a series of experiments working in conjunction with a commission to consist of the medical director of the reservation, the Federal board of medical examiners, and possibly one or more delegates from the county medical society. This work would probably extend over a period of a year or more. It is believed that an appropriation can be obtained from Congress and that the cooperation of the Secretary of War, the Secretary of the Navy, and the Public Health and Marine-Hospital Service can be secured as well as such facilities as can be extended by the Army and Navy general hospital.

I am in receipt of a letter from the secretary of the council on pharmacy and chemistry of the American Medical Association stating that the council's committee on therapeutic research has been planning to secure the cooperation of scientists for a thorough study of

the therapeutic value of mineral waters, and I also note that at the sixty-second annual session of the American Medical Association held at Los Angeles, June 26 to 30, 1911, the following resolution was passed:

Owing to the importance attributed to radioactive mineral waters in the treatment of gouty and other affections by competent European observers, and the special interest excited by the symposium on the subject at the Thirty-second Balneologic Congress recently held in Berlin, the section on pharmacology and therapeutics of the American Medical Association requests the house of delegates to suggest to the United States Government the advisability of investigating the radioactivity of the various mineral waters of the United States and publishing the result for the benefit of the medical profession.

The water of the hot springs has been examined by Profs. B. B. Boltwood and Joseph Hyde Pratt, chemists, of New Haven, Conn., as to its radioactivity and their report contains the following conclusions:

(1) The waters of the springs on the Hot Springs Reservation are all radioactive to a marked degree.
(2) The radioactivity of the waters is due to dissolved radium emanation (a gas) and not to the presence of salts of or other radioactive solids.
(3) The tufa deposited by the springs does not contain appreciable traces of radium.

The first point to determine is whether there is a reasonable probability that such a series of investigation would yield results of value to the medical profession and through them to suffering humanity. It is not desired to enter upon a fool's errand or to undertake the work with any view toward commercial exploitation, but rather to determine the legitimate therapeutic value of the water and of the resort and to obtain the respect and support of the medical profession in the development in our own country of a spa that will compare favorably with the resorts of like character abroad.

There is inclosed for your information certain reports and circulars bearing on the subject in a general way, and if after reading this more detailed explanation you are willing to advise as to whether or not the department would be justified in taking up this work you would confer a service that would be greatly appreciated.

Very respectfully,

HARRY M. HALLOCK,
Medical Director.

DEPARTMENT OF BIOLOGICAL CHEMISTRY,
HARVARD MEDICAL SCHOOL,
Boston, February 27, 1912.

Dr. H. M. HALLOCK,
Hot Springs, Ark.

DEAR SIR: Your letter of February 21, together with the reports and circulars on the hot springs water, has thrown new light on the subject so far as I am concerned. If the facts reported by Dr. Martin are substantially correct the effects of the water constitute a legitimate and important subject for research from the standpoint of metabolism as well as from the standpoint of clinical medicine.

Before any serious metabolism work could be undertaken something in the way of a chemical laboratory would have to be arranged for. That laboratory would not need to be large and would be of permanent value, for in a place of that sort where so many sick

people come there should be facilities for making chemical examinations in connection with the treatment of patients. As such it might be made practically self-supporting. I have never been in Hot Springs and therefore have no idea as to the facilities now available. I believe that you are justified in going ahead with the work of securing an appropriation from Congress for such work. You might perhaps go ahead with greater confidence after consulting with other experts in biochemistry. I, therefore, send you a list of the members of the American Society of Biological Chemists.

So far as the actual biochemical investigation is concerned it looks to me as though it would be necessary to virtually get two men, one of high standing and recognized ability to plan and direct the work in conjunction with the commission referred to in your letter, and an assistant to stay at Hot Springs all the time till the work is finished. All the mature and recognized men hold positions which they, of course, can not give up for a temporary work like that involved at Hot Springs. There is a certain element of danger in that arrangement, too, unless the director also is required to spend a considerable time on the spot, and the assistant must be no beginner, for much will depend on his keenness and discrimination.

If I can assist you further, don't hesitate to write me again.

Very truly, yours,

OTTO FOLIN.

Dr. H. M. HALLOCK,
Hot Springs, Ark.

DEPARTMENT OF THE INTERIOR,
HOT SPRINGS RESERVATION,
OFFICE OF MEDICAL DIRECTOR,
Hot Springs, Ark., March 4, 1912.

Prof. OTTO FOLIN,
Harvard Medical College, Boston, Mass.

SIR: I beg to acknowledge your letter of February 27, 1912, and desire to express my appreciation of your interest and to thank you for the assistance you have so willingly given.

In the last paragraph you state, "If I can assist you further, don't hesitate to write me again."

It is the desire of the department to have a bill introduced at the present session of Congress asking for an appropriation for carrying on the work of a commission in determining the physiological and therapeutic effects of the waters of the hot springs. The time is rather short and in all probability it will be necessary to determine the details of the work and to appoint the personnel at a later date. In order to determine the sum to be requested, however, it is necessary to have an estimate of the cost of the investigations.

I am in receipt of a letter from the department which reads in part as follows:

> I have to request that you will take up the subject with the other members of the Federal registration board and submit a general outline as to the amount of money which you think should be appropriated by Congress for this purpose, such appropriation to include compensation of physicians employed, laboratory facilities, appliances, and hospital facilities in connection with the matter.

In submitting the estimate of the amount to be appropriated for this purpose a lump sum will be asked for, out of which all necessary expenses, including compensation of experts, etc., is to be paid, and it is also proposed to suggest to Congress that the Secretary of War, the Secretary of the Navy, and the Public Health and Marine-Hospital Service, be authorized to cooperate with this department in handling the subject, the entire matter to be under the supervision of the Secretary of the Interior.

It would be of material assistance if you would be willing to give at least an approximate estimate as to the necessary expenditures basing the figures on the work of such a commission for the first year, and also if you could express an opinion as to the number of years that would be required to complete the work.

It is believed that hospital facilities can be obtained at the Army and Navy general hospital without cost other than the subsistence of patients. Information is especially desired as to the probable cost of the following items:

Compensation of expert.

Compensation of assistant.

Chemical laboratory equipment and operation (exclusive of building).

Number and cost of animals used for experimental purposes.

Number of healthy subjects to be employed for experimental purposes.

Number of patients to be observed.

Thanking you for any assistance you may be able to render, I am,

Very truly, yours,

HARRY M. HALLOCK,
Medical Director.

JEFFERSON MEDICAL COLLEGE,
Philadelphia, December 26, 1911.

HARRY M. HALLOCK,
Medical Director, Hot Springs Reservation,
Hot Springs, Ark.

DEAR DOCTOR: Your letter of December 19, 1911, will be referred to the appropriate committee of our faculty immediately after the termination of the holidays.

Believe me, very truly, yours,

ROSS V. PATTERSON, M. D.,
Subdean.

JEFFERSON MEDICAL COLLEGE,
Philadelphia, January 8, 1912.

HARRY M. HALLOCK, M. D.,
Medical Director, Hot Springs, Ark.

DEAR SIR: Your letter of December 19, 1911, has been referred to me to name a physiological chemist.

I can heartily recommend, for the inquiry referred to, Prof. Victor Vaughan, M. D., University of Michigan, Ann Arbor, Mich.

Respectfully,

J. W. HOLLAND,
Professor of Medical Chemistry.

University of Michigan,
Department of Medicine and Surgery,
Ann Arbor, March 4, 1912.

Dr. Harry M. Hallock,
Medical Director, Hot Springs,
Hot Springs, Ark.

Dear Doctor: Your letter and the papers accompanying it have interested me very much. If it be true in any large number of cases that immersion of the body, or a part of the body, in water causes the body temperature to go several degrees higher than the temperature of the water, this is a most interesting question. It should certainly be investigated. I know of no other water in the world of which this is true. I have made a study of some of the great medicinal springs, such as those of Carlsbad, and I am quite sure that there is not another water in the world that does anything like this. It seems to me that the matter is of enough importance to justify a thorough and scientific investigation. I wish to make the following suggestion: It seems to me that it would be well for a medical board to be convened at Hot Springs for a period of 10 days to make a preliminary investigation, and report to the Department of the Interior as to what, in the opinion of the board, should be done. This board might consist of a few medical officers detailed from the Army, Navy, and Public Health Service. If such a thing as this is done, I should like very much to be on the board. I am a member of the Reserve Corps of the Army, and could be ordered on such service if the Surgeon General wishes. Please think this over and let me know what you decide about it. It seems to me that this would be the best way to get at it. If it is decided to undertake a thorough study, such a board as I have mentioned could map out the way in which the work should be done.

Thanking you very much, and with best wishes, I am,

Yours, truly,

V. C. Vaughan.

Department of the Interior,
Hot Springs Reservation,
Office of Medical Director,
Hot Springs, Ark., March 8, 1912.

Prof. Victor Vaughan, M. D.,
University of Michigan, Ann Arbor, Mich.

My Dear Prof. Vaughan: I beg to acknowledge your letter of March 4, 1912, in reply to my inquiries of February 20, and to thank you for your interest and the careful consideration you have given the matter. Your suggestion as to the appointment of a preliminary board to be assembled at Hot Springs for the purpose of making a report to the department will be borne in mind. It will take some little time to arrange the details of the proposed investigations but there is one point that it is greatly desired to have settled at once, and that is the amount of money that should be requested as an appropriation by Congress for carrying on the work.

I am in receipt of a letter from the department which reads in part as follows:

I have to request that you will take up the subject with the other members of the federal registration board and submit a general outline as to the amount of money

which you think should be appropriated by Congress for this purpose, such appropriation to include compensation of physicians employed, laboratory facilities, appliances, and hospital facilities in connection with the matter.

In submitting the estimate of the amount to be appropriated for this purpose a lump sum will be asked for, out of which all necessary expenses including compensation of experts, etc., is to be paid, and it is also proposed to suggest to Congress that the Secretary of War, the Secretary of the Navy, and the Public Health and Marine-Hospital Service, be authorized to cooperate with this department in handling the subject, the entire matter to be under the supervision of the Secretary of the Interior.

It would be of material assistance if you would be willing to give at least an approximate estimate as to the necessary expenditures basing the figures on the work of such a commission for the first year, and also if you could express an opinion as to the number of years that would be required to complete the work.

It is believed that hospital facilities can be obtained at the Army and Navy general hospital without cost other than the subsistence of patients. Information is especially desired as to the probable cost of the following items:

Compensation of expert.

Compensation of assistant.

Chemical laboratory equipment and operation (exclusive of building).

Number and cost of animals used for experimental purposes.

Number of patients to be observed.

Thanking you for any assistance you may be able to render, I am,

Very truly yours,

HARRY M. HALLOCK,
Medical Director.

UNIVERSITY OF MICHIGAN,
DEPARTMENT OF MEDICINE AND SURGERY,
Ann Arbor, March 11, 1912.

DR. HARRY M. HALLOCK,
Medical Director, Hot Springs Reservation,
Hot Springs, Ark.

DEAR DOCTOR: In reply to yours of March 8 I will say that it would be necessary to equip and supply a laboratory. There would have to be tables, sinks, shelves, benches for balances, at least two first-class balances, at least two good microscopes, a full set of chemicals, beakers, graduates, buretts, recording apparatus, drums, in fact everything necessary for a first-class pharmacological laboratory. The research part of our pharmacological laboratory, not counting the part devoted to students, inventories about $5,000. This of course does not include the room nor the permanent equipment of the room. I should say for laboratory purposes there should be an appropriation of about $10,000. The director of the laboratory should have a salary of $5,000. There should be two good assistants, each of whom should receive a salary of $3,500. There should be two subassistants, each of whom should receive $2,000. There should be two laboratory servants, each of whom should receive $1,000. The cost of animals used for experimental purposes would not be less than $500. There should be not less than 200 patients under observation, while 25 normal persons should be used for controls. I can not give you any estimate as to what this would cost. The figures that I have given,

except for laboratory equipment, of course mean annual expenditures. I think provision should be made for two years of work.

Probably this will give you enough to assist you in figuring out what appropriation you should ask for. If I can be of further service to you in this matter please consider me at your command.

Yours, truly,

V. C. VAUGHAN.

UNIVERSITY OF PENNSYLVANIA,
Philadelphia, December 22, 1911.

MY DEAR SIR: I beg to acknowledge receipt of your letter of the 19th instant in regard to experiments with a view to determining the physiological effects of the water of the hot springs of Arkansas. I shall take pleasure in referring this matter to the dean of our school of medicine, with the request that he be kind enough to make any suggestion that may be feasible in the matter.

Believe me, very sincerely, yours,

EDWARD ROBINS, *Secretary.*

HARRY M. HALLOCK, M. D.,
Medical Director, Department of the Interior,
Hot Springs, Ark.

UNIVERSITY OF PENNSYLVANIA,
Philadelphia, December 22, 1911.

Mr. H. M. HALLOCK,
Hot Springs, Ark.

MY DEAR MR. HALLOM: Your letter to the secretary of the University of Pennsylvania has been referred to me for reply. I would suggest to you the name of Prof. A. E. Taylor, our professor of physiological chemistry, medical school of the University of Pennsylvania. You may know of him as one of the so-called Remsen board connected with the United States Department of Agriculture. He is at present in California but will return in about 10 days, and a letter addressed to him at the medical school of the University of Pennsylvania will reach him within a short time. If he can not personally undertake the work, very possibly he can arrange to have it done under his direction by some of his assistants.

Very sincerely,

A. J. SMITH, *Dean.*

UNIVERSITY OF PENNSYLVANIA,
Philadelphia, February 23, 1912.

Dr. H. M. HALLOCK
Hot Springs, Ark.

MY DEAR DR. HALLOCK: In reply to your communication in reference to taking up work on a commission to investigate the waters of the hot springs, it will not be possible for me to give you any reply until I know more about it. How much time would be consumed? How much time would need to be spent there? Of course, scientific

results could be reached by proper investigations. If you will let me know what would be expected I will be in a position to say whether I could be available.

Thanking you, I am, very truly, yours,

A. E. TAYLOR.

DEPARTMENT OF THE INTERIOR,
HOT SPRINGS RESERVATION,
OFFICE OF MEDICAL DIRECTOR,
Hot Springs, Ark., February 28, 1912.

Prof. A. E. TAYLOR,
University of Pennsylvania,
Philadelphia, Pa.

SIR: Replying to your letter of February 23, requesting further information as to the proposed investigation of the physiological effects of the water of the hot springs of Arkansas, I beg to say that it is believed that it would be necessary for whoever undertakes this work to be present in Hot Springs and to devote practically his entire time to it. It is thought that the series of experiments would extend over the period of one year, and that by the expiration of that time it would be possible to determine whether it would be worth while to continue them longer. These observations would naturally be directed toward noting changes in metobolism, excretion, secretion, blood changes, and variation of vascular tension, both in the sick and in the well. The investigator would have largely to plan his own work, the object being to define if possible the legitimate therapeutic value of the water in the various forms of its administration. There is at present more or less difference of opinion on all these points.

It is desired to have the observations conducted in a way and by one whose work will be accepted by the medical profession as reliable and ethical to the general, and that we may have in our own country a spa that will compare favorably with places of like character abroad.

The first point to be determined is whether by investigations of this character it would be possible to arrive at sufficiently definite results to warrant the undertaking. The second point to be determined is an approximate estimate, as much in detail as practicable, of the cost.

Very respectfully,

HARRY M. HALLOCK,
Medical Director.

COLUMBIA UNIVERSITY,
COLLEGE OF PHYSICIANS AND SURGEONS,
New York, January 18, 1912.

Dr. HARRY M. HALLOCK,
Medical Director, Hot Springs Reservation,
Hot Springs, Ark.

DEAR SIR: Our faculty referred your letter of December 19 to Dr. William J. Gies, professor of biological chemistry, and Dr. Gies writes in reply as follows:

I desire to nominate Jacob Rosenbloom, M. D., Ph. D., associate in biological chemistry, as a physiological chemist competent to conduct the proposed series of

experiments on the physiological effects of the water of the hot springs of Arkansas. I assume that the work will offer such remuneration as would enable Dr. Rosembloom to give all his time an attention to the investigation. His thorough medical training and his extended chemical experience here, and his numerous investigations of the past few years, convince me that he would be more than ordinarily competent to conduct the work to which the medical director of the Hot Springs Reservation refers in his letter of December 19, which you have submitted to me.

I trust that this answers your inquiry of December 19.

Yours. very truly,

SAML. W. LAMBERT, *Dean.*

COLUMBIA UNIVERSITY,
COLLEGE OF PHYSICIANS AND SURGEONS.
New York, December 23, 1911.

DR. HARRY M. HALLOCK.
Medical Director, Hot Springs Reservation,
Hot Springs, Ark.

DEAR SIR: In reply to your letter of December 19, I would state that your inquiry will be placed before the faculty of medicine at their meeting on Monday, January 15. Their decision will be communicated to you as soon as possible after that meeting.

Yours, very truly,

SAML. W. LAMBERT, M. D., *Dean.*

PHILADELPHIA, PA., *March 1, 1912.*

MY DEAR DR. HALLOCK: I have your kind letter. It would not be possible for me to undertake any such work as you have detailed. You have the correct plan, and I wish you success in it.

Very truly, yours,

A. E. TAYLOR.

COLUMBIA UNIVERSITY,
COLLEGE OF PHYSICIANS AND SURGEONS,
New York, March 27, 1912.

DEAR DR. HALLOCK: I have read with care and attention your communication of recent date and the documents that came with it. I am convinced that it would be in the public interest to conduct a thorough investigation on the waters in the hot springs of Arkansas. It is obvious that positive therapeutic value, if such is possessed by the waters, might be clearly established by adequate investigation. It is just as clear that lack of curative properties would be shown by proper investigations if remedial qualities were lacking. Either result would provide knowledge of public utility. Should it ultimately be decided to proceed with such work, it would give me pleasure to nominate Prof. William H. Welker, of this department, to take charge of it.

Prof. Welker cooperated with me several years ago in a research on the effects of radium after its introduction into the body, and his training as a physicist, chemist, and biologist makes him particularly competent to conduct work of the kind in the proposed research

under consideration. Prof. Welker's family have for some time preferred to live in a smaller city than New York, and I am confident you would find him ready to accept appointment in this relation, providing it would make it possible for him financially to accept.

Yours, very truly,

WM. J. GIES.

UNIVERSITY OF PENNSYLVANIA,
Philadelphia, February 28, 1912.

The MEDICAL DIRECTOR, HOT SPRINGS RESERVATION,
Hot Springs, Ark.

DEAR SIR: I have your letter of February 20, informing me of the plan, lately taken under consideration by the Secretary of the Interior, of conducting a series of investigations in reference to the physiological action of the water at Hot Springs, and inquiring as to my opinion of the probable value of such an investigation and my own willingness to take part in it.

In view of the number of persons who go to Hot Springs in hope of being benefited by the baths, I am decidedly of the opinion that such an investigation should be undertaken, and conducted completely—and of course impartially—with the object simply of ascertaining what definite and demonstrable physiological effects the water is capable of producing. There is no doubt that the reports of cures, and the claims made by persons whose health has been improved while or after taking the baths, are often highly inaccurate and misleading. Post hoc is not propter hoc, and the only way of finding whether any connection exists between the properties of the water and the benefit gained by patients who undergo treatment at the springs is a scientific investigation conducted by entirely unbiased and properly qualified persons. There is no doubt that the results of any such carefully conducted investigation would be of value both to science and to the medical profession.

I am, however, not prepared to accept an appointment of the kind you describe. I am not a medical man, and I have never engaged in any investigations having a purely medical bearing, so that I feel myself unqualified to take part in an investigation of this nature. There are, however, a considerable number of physiological chemists in the country who are primarily interested in the medical applications of their science, and there would, I believe, be little difficulty in securing the services of one or more well qualified investigators.

Thanking you for your courtesy, and appreciating the honor implied in your offer, I remain,

Yours, very truly,

RALPH S. LILLIE.

COLUMBIA UNIVERSITY BIOCHEMICAL ASSOCIATION,
New York, March 14, 1912.

MY DEAR DR. HALLOCK: Your letter of the 20th just received on my return to the city from a western trip.

I think results could be obtained from the work you mention that would well commensurate with the expenditure involved. * * *

It is impossible for me to state what the work would cost without a full knowledge of the exact scope of the work.

Respectfully,

JACOB ROSENBLOOM.

PENNSYLVANIA STATE COLLEGE,
INSTITUTE OF ANIMAL NUTRITION,
State College, Pa., March 20, 1912.

Dr. HARRY M. HALLOCK,
Medical Director, Hot Springs Reservation,
Hot Springs, Ark.

DEAR SIR: I am in receipt of your letter of March 16, and in reply would say that a scientific investigation of the therapeutic value of the water of hot springs seems to me a very desirable undertaking, both as a means of increasing scientific knowledge of the general subject and as a practical measure to better utilize this natural resource.

As regards methods, I do not feel competent to make any suggestions other than the very obvious one that it is essential that the committee or commission charged with this work should be composed of men whose scientific standing and personal character will put the results of their work above criticism. If it is possible to secure such men, they would be more competent than anyone else to determine upon the methods to be followed, and if they were not competent to do this they would not be suitable members of a commission.

Very respectfully, yours,

W. P. ARMSBY, *Director.*

CATONSVILLE, MD., *March 21, 1912.*

Dr. H. M. HALLOCK,
Hot Springs, Ark.

DEAR DOCTOR: For more than 20 years the physiological action of certain mineral waters has been a puzzle to me. I could not explain why a carefully prepared artificial imitation of certain natural waters would not act alike, even when the natural water was not taken at the source but bottled and shipped away. The chemical analyses showed the same constituents in the same proportions, and yet I was forced to admit through evidence before my eyes that the physiological action of the waters was not identical.

The thought sometimes occurred to me that our analytical methods were not sufficient to show the presence of some agent or agents imparting such properties to the respective waters. It was, therefore, I might say, a relief to my troubled mind when, through the wonderful discovery of radium and radioactivity a possible explanation might be found.

From these remarks you may readily draw the conclusion that I am thoroughly in favor of any steps which may lead through a scientific study to definite results.

Very truly, yours,

Dr. W. SIMON,
College of Physicians and Surgeons,
Baltimore, Md.

SHEFFIELD LABORATORY
OF PHYSIOLOGICAL CHEMISTRY,
YALE UNIVERSITY,
New Haven, Conn., March 22, 1912.

Dr. H. M. HALLOCK,
Hot Springs, Ark.

DEAR SIR: In reply to your communication of the 16th concerning the advisability of making an experimental study of the influence of the hot springs waters upon the body, I would say that such a procedure would be very desirable. Just at this time precisely this type of work is being carried forward in certain laboratories abroad, but they have not the opportunity or facilities that may be possible in the work proposed in your letter. The investigation would be of scientific value whatever the outcome, and in every sense is a proper and legitimate subject for research.

Very truly, FRANK P. UNDERHILL.

THE OTHO S. A. SPRAGUE MEMORIAL INSTITUTE,
Chicago, March 22, 1912.

Dr. HARRY M. HALLOCK,
Hot Springs Reservation, Hot Springs, Ark.

MY DEAR DR. HALLOCK: From what I can learn in the communications you have just sent me concerning the waters of the hot springs, it would seem most desirable that thorough investigation on the physiological action of the springs, both upon man and animals, be made under Government auspices, so that we may have unprejudiced and reliable information upon which to base future therapeutic use of the springs. It is my opinion, in reply to your direct question, that the subject is most decidedly a legitimate and proper subject for scientific research not only from the standpoint of clinical medicine, but also from that of physiology.

Yours, very truly, H. GIDEON WELLS, *Director.*

CORNELL UNIVERSITY,
DEPARTMENT OF CHEMISTRY,
Ithaca, N. Y., March 19, 1912.

Dr. HARRY M. HALLOCK,
Medical Director, Hot Springs, Ark.

DEAR SIR: Your circular letter of March 16 came yesterday, and I have read it with great interest and care. Prof. J. K. Haywood, of the Bureau of Chemistry, who made the chemical analysis of the water of the hot springs, is a graduate of the chemical department of this university and a personal friend of the writer. I also know the other chemists you mention in your letter, and feel sure that their reports and conclusions are reliable and valuable. Something more is required, however, than a mere chemical analysis, and I think the arrangement contemplated by the Secretary of the Interior to secure the services of a competent physiological chemist to work in conjunction with a commission of medical men an excellent one.

It seems to me that the results of such an investigation would be of great value, and I am of the opinion that the work contemplated is a legitimate and proper one for scientific research from the standpoint of clinical medicine.

I would suggest that an attempt be made to get the Carnegie Institution and the Rockefeller Foundation for Medical Research interested in the matter. Dr. Benedict, of the Carnegie Institution, has been investigating problems connected with metabolism and knows more about this subject than any other man in this country. Dr. Benedict is now in Boston, Mass., and I feel sure he would be much interested in such an investigation as you contemplate.

The Rockefeller Foundation has a very able corps of experts whose aid would be absolutely invaluable in such investigation. I have mentioned these institutions because any results published by them would command attention and be at once accepted by the medical profession. I suppose you are familiar with the work Dr. Benedict has been doing with the calorimeter, and I need not emphasize the importance of this kind of work in connection with the present investigation of the therapeutic value of these waters.

Yours, very truly,

W. R. Orndorff,
Professor of Organic and Physiological Chemistry.

American Climatological Association,
March 21, 1912.

Dr. Harry M. Hallock,
Medical Director.

My Dear Sir: I beg to acknowledge your very kind letter of the 18th instant, and also your very interesting report for 1911 to the Secretary of the Interior, with other inclosures.

I will reply later on to the subject referred to in your letter and as it is quite complicated I should give it consideration and see if some plan can not be outlined to afford a practical plan of investigation.

Very truly, Guy Hinsdale.

Carnegie Institution of Washington,
Nutrition Laboratory,
Fenway, Boston, Mass., March 21, 1912.

Dr. Harry M. Hallock,
Medical Director, Hot Springs, Ark.

Dear Sir: I have your circular letter of March 16 with regard to investigations of the therapeutic value of the water of the hot springs of Arkansas, and I have glanced through the literature that you have sent along with this letter. There is no difficulty in determining definitely by physiological tests the action of water, provided it has any. There is a great question in the minds of experimenters as to the influence of radium emanation on metabolism, and I must confess I feel very skeptical with regard to many of the experiment reports in the literature you sent me; inasmuch as the main claim to benefit from the hot springs water is their radioactivity upon metabolism.

This could only be done by persons trained in metabolic studies, particularly studying the gaseous exchange, so as to make some estimation of the actual amount of metabolic activity. Unless such a series of experiments be made, I should look very much askance at any studies undertaken. If the United States Government wishes to send to the laboratory an accredited scientist to learn the technique of making these studies, I shall be very glad to accord him what facilities we can; other than that, we are not in a position to do anything.

I am, very truly, yours, FRANCIS G. BENEDICT.

BALTIMORE, *March 22, 1912.*

Dr. HARRY M. HALLOCK,
Hot Springs Reservation, Hot Springs, Ark.

DEAR SIR: In reply to your letter of March 18, I would state that I believe it would be an investigation of great value to have a study made of the action of the hot springs water, not only its effects on the body in health but also in diseased conditions and its effects upon metabolism.

I believe that in order to be of any value such an investigation would have to be undertaken by a number of well-trained men, and that it would have to extend over a considerable period of time, and that an important part of the work would be to investigate the effect of the water in reference to any deleterious changes that it might cause. It seems that in certain diseases the water does harm rather than good.

I have no special suggestions at this time to make regarding the scope of such an investigation, but certainly urge that it be undertaken with the view of placing these curative waters on a scientific basis, where they certainly deserve to be.

Very sincerely, yours, JOHN RUHRAH.

TULANE UNIVERSITY OF LOUISIANA,
New Orleans, March 25, 1912.

Dr. HARRY M. HALLOCK,
Medical Director, Hot Springs Reservation,
Hot Springs, Ark.

DEAR DOCTOR: I am glad to reply to your communication of March 18, but must necessarily do so in a very general way.

I have always deplored the popular estimate of hot springs in their relation to syphilis, and have considered that more harm has been done to the victims of this disease through hot springs than through any other agent in modern times. The belief of the general public in the efficacy of the water of hot springs has created the impression that one or two "courses" there was all that was needed for a cure, and you know the results.

I believe that the thorough investigation of hot springs in its relation to syphilis is not only desirable but imperative for the good of the American people and for the education of the rank and file of the profession.

It should be especially demonstrated that hot springs have advantages over ordinary hot baths or other thermal resorts, if such be

the case, and I shall welcome the results of the efforts of the Government in this direction.

It will require some time to obtain the proper results, and these should be derived from systematic experiments with groups of cases not only of syphilis but of skin diseases and of those other ailments (like rheumatism, gout, etc.) which are now in the habit of being treated at the springs.

If I can be of any other service at any other time I shall be glad to serve you.

Very truly, yours, J. Radovet Dyer, *Dean.*

Boston, *March 23, 1912.*

Dr. Harry M. Hallock,
Hot Springs, Ark.

My Dear Sir: I acknowledge with thanks the receipt of your favor of March 18. In reply to your question, I would give it as my opinion that the thorough investigation into the effects of the waters from the hot springs would certainly be a legitimate and proper subject for scientific research from the standpoint of clinical medicine. It seems to me very desirable to determine what effects these radioactive waters have on healthy animals and healthy human beings. It might be desirable also to determine whether or not these effects differ from those obtained by the use of ordinary waters at the same temperature as that from the springs itself. The medical world and humanity would be the richer for the possession of this knowledge.

Very truly, yours, J. P. Sutherland.

New York City, *March 29, 1912.*

Dr. Harry M. Hallock,
Hot Springs Reservation, Hot Springs, Ark.

Dear Sir: Your letter of 16th instant at hand. In answer to your question I am of the opinion that a carefully conducted investigation into the various effects of radioactive waters upon metabolism would be of scientific value. But such a research would not be at all a simple one, and, in my opinion, the ordinary type of observation conducted on patients under treatment is devoid of scientific value. Only such studies as utilize the most perfect methods are worthy of consideration. These should be in the first place physiological, and then with these results as a basis some deduction might be made regarding pathological conditions. I should be interested in seeing such work done, but it is by no means certain that any practical result could be arrived at.

Yours, truly, N. B. Foster.

Brooklyn Institute of Arts and Sciences,
Brooklyn Botanic Garden, March 27, 1912.

Dr. Harry M. Hallock,
Hot Springs Reservation, Hot Springs, Ark.

My Dear Sir: Your letter of March 16, addressed to me at the University of Missouri, has been forwarded to me at my address as given above.

I am very much interested in the proposition to make a thorough investigation of the physiological and therapeutic properties of the waters of the hot springs. It seems to me that it is a very desirable thing to do, not only because of its scientific interest, but also because it may be the means either of protecting the public against worthless expenditure of money for treatment of no value, or be of positive benefit in demonstrating the real efficacy of the hot springs baths for certain ailments or merely as a tonic.

I should think the subject was one entirely legitimate and proper for scientific research, to be undertaken under Government auspices. In fact, it seems to me that it is unfortunate that such an investigation has been so long delayed, in view of the fact that so many people have been led to look for relief and have spent considerable sums of money in that direction at the hot springs.

I believe the investigating staff should include a physiological chemist, a physical chemist, and a practicing physician, and the data gotten together ought to include information with reference to the history of past treatments, with their success or failure for different diseases, not only at these springs, but also by comparison with similar springs abroad.

Undoubtedly, if a competent force of investigators was appointed, the details of the investigation could very properly and advantageously be left to them.

I should be very much interested to know what further steps are taken in this matter, and if I can in any way render any service in this connection I shall be more than glad to do so.

Thanking you for the courtesy of addressing me on the subject, I am,

Yours, very sincerely, C. Stuart Gager.

Rockefeller Institute for Medical Research,
New York, April 2, 1912.

Dr. Harry M. Hallock,
Hot Springs, Ark.

Dear Sir: Your favor of the 16th was received, and, with the accompanying paper, read with interest. The striking physiological properties of the hot springs assuredly deserve a thorough investigation. For that I can suggest nothing better than the assignment of a properly equipped physiological chemist from the Department of Agriculture or the Public Health and Marine-Hospital Service to remain on the work until it has been completed to a satisfactory degree.

Yours, very truly, Donald A. Van Slyke.

Chicago, *March 27, 1912.*

Dr. Harry M. Hallock,
Medical Director, Hot Springs Reservation, Ark.

Dear Doctor: I would say in reply to your inquiry that I am heartily in sympathy with the proposed investigation, under the auspices of the United States Government, of the physiologic effects of the waters of the hot springs of Arkansas. Am convinced that

our national resources, climatic as well as balneologic, do not receive the attention and the study that they deserve.

Investigation conducted by persons commercially interested in a health resort are hardly likely to be of great scientific value, as personal bias can not be eliminated even by good intentions. Such investigations should be conducted by the Government, and the results, good or bad, published for the benefit of the people.

Thanking you for the opportunity to express my opinion in this matter, I am,

Yours, very truly, BERNARD FANTUS, M. D.

WINNIPEG GENERAL HOSPITAL,
Winnipeg, March 25, 1912.

Dr. HARRY M. HALLOCK,
Medical Director, Hot Springs Reservation,
Hot Springs, Ark.

DEAR DOCTOR: In reply to yours of March 16, I am much gratified that the effort is at last being made to put America's best-known spa on a scientific basis, as the taint of the Diamond Joe régime has probably been the greatest drawback the hot springs have ever had, and they have not been permitted to do the good of which they are capable. It would be of great value to the profession of the country if they could have a definite and reliable statement of the actual therapeutic value of the springs. While we know, of course, that the bulk of the good results of the foreign springs rests on a more or less scientific basis, the present day developments of radiotherapy indicate that if these springs are really endowed with radioactivity they may become of great value.

As to the method of investigation. Your letter suggests a physiological chemical investigation. I assume that this term is used in its broad application to include pharmacology and experimental therapeutics, as it is with mineral waters particularly that physiological chemistry, or any chemistry alone, is extremely liable to lead us astray, the only thing of any great reliability being actual animal experimentation, followed by definite experimental therapy, for which I suppose the hospital would furnish sufficient material, after the animal experiments had suggested promising lines of procedure.

If I can at any time be of service, I will be pleased to do so, not the least for the reason that while I am now under the British flag, I still hold my commission in the M. R. C.

Yours, respectfully,

W. P. MORRILL, M. D., *Superintendent.*

MADISON, WIS., *March 19, 1912.*

Dr. HARRY M. HALLOCK,
Medical Director, Hot Springs Reservation,
Hot Springs, Ark.

DEAR SIR: Yours of the 16th instant at hand. I would state to begin with that I am hardly qualified to answer authoritatively the questions asked. Reports of the work done abroad in determining

the effects upon metabolism of radioactive baths and drinking waters does not seem to offer great encouragement in this field. A number of such investigations have been carried on, the reports of which have been published in the Zeitschrift for Experimentelle Pathologie Und Therapie during the last few years. Very little, if anything, tangible has been found to indicate any deep-seated or definite effect upon metabolism. My own impression, therefore, is that much time might be wasted in such investigation. On the other hand I should hesitate to express a positive opinion which might in the slightest degree discourage research along any line. This line seems so much less promising than many others in the field of preventative and curative medicine that I should personally prefer to see the Government appropriate money for more valuable lines of investigation. * * *

I believe it is generally conceded that the cures effected by the well-known spas of Europe are to be attributed to the out-of-door life enjoined on the patients, to the regular regimen of diet and sleep and exercise; to the simple, nutritious food provided, rather than to any inherent property of the waters themselves. It is possible, however, that these radioactive waters may prove beneficial in certain types of skin diseases.

Very truly, yours, H. C. BRADLEY.

NOTE.—Harold C. Bradley, assistant professor of physiological chemistry, department of physiology, University of Wisconsin.

UNITED STATES DEPARTMENT OF AGRICULTURE,
OFFICE OF EXPERIMENT STATIONS,
Washington, D. C., March 27, 1912.

Dr. HARRY M. HALLOCK,
Medical Director, Hot Springs Reservation,
Hot Springs, Ark.

DEAR SIR: Your letter of March 16 was received, together with the additional data regarding the Arkansas hot springs. I am much interested in the subject and in the plans for future development. Without doubt biochemical studies of the effects of the waters would prove valuable.

In my judgment, it is also important to study the effect of food conditions in combination with the waters. A number of years ago, an attempt was made in connection with the nutrition investigations of this office to compile experiments with men and animals in which the balance of income and outgo was determined usually in terms of nitrogen. As the work progressed it became evident that a very large number of studies had been made in which the effects of mineral waters and baths of different sorts and similar factors had been studied.

A considerable number of the articles abstracted were published in Russian, and others in French and German. Many additional reports have appeared since our bulletin was published, and it may safely be said that the total amount of literature existing on this subject is fairly large. In my opinion, this material might be very profitably collected and digested as a preliminary to and in conjunction with other studies, the Arkansas springs.

It might be possible to arrange for cooperation between your bureau and the Office of Experiment Stations, for such a project, should you think favorably of it.

Trusting that it will prove of interest to you, the Division of Publications has been asked to mail you under separate cover a copy of Bulletin 45, of the Office of Experiment Stations, Dietary Studies in New York City in 1895 and 1896, which contains a summary of the data referred to above, and also a number of our general publications on food and nutrition topics.

Very truly, yours, C. F. LANGWORTHY,
Chief of Nutrition Investigations.

NEW YORK, *March 23, 1912.*

DR. H. M. HALLOCK, *Medical Director.*

DEAR DOCTOR: Your letter of the 15th instant has given me great satisfaction in that it is in line with efforts I have been making for a long time to study the scientific and practical aspects of our abundant and numerous mineral waters. The latter, having been so long exploited by commercial enterprise, have fallen into desuetude because physicians have not observed the therapeutic results they had reason to expect from the too often false representations of advertisers and promoters. Moreover, medical men at some of these springs, being in the employ of or at least dependent for patronage upon the proprietors of the springs, have not been as frank as was their real desire, in dissuading persons whose cases were not adapted to the waters of their particular resort from remaining. This is one reason for my hearty approval of the scientific investigation of the waters of Hot Springs and their clinical application under unbiased and skilled supervision. This may seem a singular reason, but I am convinced that if the definite and reliable results that will surely accrue from the investigation you propose will stimulate other spring owners to follow your example, and the result will be the same splendid one which has been achieved by the demonstrations of the Department of Agriculture to our farmers. Every good health resort will emulate your example, and there will ensue a renaissance in physical therapeutics which I have been in vain endeavoring to initiate. So far my result has been mainly to convince intelligent physicians that there is a physiological action of water which has not been sufficiently studied and that water may be applied therapeutically with success only upon the same physiological basis as digitalis or strychnia or other medicinal agents. Prior to the discovery of the effect of radioactivity in mineral waters, I have based all hydrotherapeutic action on the thermis, mechanical, and (feeble) chemical excitation of the cutaneous nerve and vascular supply when used externally. In my article on "Mineral springs," in the first edition of "Hare's System of Practical Therapeutics," I stated that "it is more important for the physician who sends a patient to the springs to know the mental composition of the doctor than the chemical composition of the water." Little confidence have I had in the latter. If radioactivity may be added to the feeble and often inert chemical constituents which are the boast of most of the springs, their therapeutic

value will surely be vastly enhanced. I heartily indorse the plan contemplated by the Secretary of the Interior of securing the services of a competent physiological chemist to work in conjunction with a commission of medical men.

I am convinced that there "is a reasonable probability that a series of biochemical investigations on animals and human beings, both the sick and the well, would yield results that would be of value to the medical profession, and through them to suffering humanity." The whole subject is of great promise from a clinical standpoint. Not having received the inclosures you refer to, I am not prepared to give you suggestions. I need not say that you will need physicians who have more than an academic acquaintance with hydrotherapy. Indeed, I discussed the subject of your letter two summers ago with Surg. Gen. Torney, at his office in Washington, and recommended this investigation, advising that he send one of the Hot Springs staff to my clinic for observations on hydrotherapy.

Very truly, yours, S. BARUCH.

The following is an extract taken from booklet entitled, "The Success of Physical Remedies in Pulmonary Phthisis as an Index of Their Value in Other Chronic Diseases," by Simon Baruch, M. D., of New York:

[Reprint from the Medical Record, Aug. 13, 1904.]

The celebrated health resorts of Germany, which attract a multitude of people, more or less afflicted with chronic diseases, do not owe their well-earned reputation so much to the climate and chemical composition of the waters or other local conditions as is generally supposed. These useful therapeutic elements would be absolutely inefficient if their application were not directed by the medical men residing in these resorts, who have made it a life study to investigate the climatic and balneological advantages of their respective springs, and have convinced their confières in all parts of the world, by conscientious striving for the welfare of the patients committed to their care and by the intelligent application of their respective local advantages, and by close attention to and guarding of the sanitary arrangements of the springs. It is really more important for the physician who sends his patient to health resorts or springs to know the mental composition of the doctor than to know the barometric characteristics of the climate or the chemical composition of the waters. As an example, let me cite the recent marvelous growth of Nauheim as a resort for cardiac cases, which is due to the studies of Dr. Theodore Schott and his conscientious selection of cases adapted for the Nauheim waters. By scorning mercenary methods, unfortunately prevalent at many resorts, he has builded better than he knew, for the town of Nauheim has since his death become the Mecca of patients from all parts of the world. It will retain its well-earned reputation so long as its physicians will utilize it judiciously, select the patients with care and firmly decline to retain cases not adapted, though the material interests of the resort may seem to suffer.

[New York Sun, Mar. 26, 1912.]

HOT SPRINGS RESERVATION.

By Dr. S. Baruch, professor of hydrotherapy, University of Columbia.

The enormous annual exodus to Europe of people suffering from ailments of various kinds, and especially from rheumatism and gout, involves so large an expenditure of money, time, and comfort that it becomes a matter of public interest to ascertain if these can not be avoided or at least diminished to a great extent. The fact that our own country possesses mineral springs the water of which is second to none in efficacy for healing to those of Europe has often been pointed out by some of our physicians who are specially interested in this branch of medicine. No serious effort has, however, been made to demonstrate scientifically the curative value of

these waters. The result has been that the numerous health resorts of this country from Maine to California have lacked proper utilization except for commercial purposes, a method of exploitation which has damaged their repute and inclined medical men to avoid them in their practical application of mineral springs by reason of fantastic analyses, and the most extravagant claims of curative properties made by the owners.

An awakening has come, however, manifested in the action of the New York Legislature, which has acquired the Saratoga Springs as a State reservation, impelled thereto by the systematic robbing of the precious gases contained in the Saratoga spring waters by manufacturers or distributors of carbonic-acid gas. It became quite obvious that if this course continued these waters would become practically inert for medicinal purposes. This act of the legislature was the first step in the recognition by the State of the immense value and importance of mineral springs to the welfare of the people. The development of this State reservation has been exceedingly slow and halting, probably from lack of appropriations. The commission appointed by the governor has not yet been successful in developing Saratoga as a health resort; it is to be hoped that ere long Saratoga may become as famous among physicians for the health-giving properties of its waters as it was in its golden prime for its cuisines, its fine hotels, and good sports to the seekers after pleasure.

Perhaps the action now being taken by the United States Government in developing the Hot Springs Reservation as a scientific health resort may stir up the Saratoga commission to emulate its example. For many years the hot springs of Arkansas have been famous for the treatment of rheumatism, gout, and other blood diseases. One hundred thousand visitors annually attest the efficacy of these waters. In order, however, to obtain the full benefit for the largest number, and to save many the trouble and expense of journeying to these springs without prospect of advantage, the Government has wisely determined to institute certain scientific experiments to ascertain definitely their true curative properties. A medical director has been assigned to supervise the baths and the administration of the reservation. Under the direction of Surg. H. M. Hallock, of the Army Medical Department, analyses have been made by the agricultural and geological departments, and a recent investigation has led to the discovery of what is called by physicians "radioactivity" of positive type. This does not mean that radium exists in the water of the hot springs, but "radium emanation," a gas dissolved in the water, which is regarded by medical men of great value in certain diseases, has been found which affords a more mild though effective action. This discovery is of marked importance; it places the hot springs of Arkansas on equality with, if it does not render them superior, to most of the renowned springs of Europe which claim radioactivity for their waters.

That further observations on this subject, together with the practical application of the waters in disease, will be absolutely reliable and entirely free from commercial bias is guaranteed by the type of men under whose direction they will be executed. It is to be hoped that the Congress may grant any appropriation that may be called for to further the thorough investigations, scientific and practical, which are proposed. The outcome of the latter can not be overestimated. It will not only be of immediate value to the large number of sufferers who flock to these springs, but, what is more important, the systematic and scientific application of this mineral water will demonstrate to owners of other springs and to physicians that the European methods of administration are worthy of imitation, especially when they will be improved by the infusion of the true American spirit of utility to the largest numbers. The development of this long-neglected field may inure to the lasting benefit of our people.

THE STATE UNIVERSITY OF IOWA,
DEPARTMENT OF CHEMISTRY,
Iowa City, March 18, 1912.

HARRY M. HALLOCK, M. D.,
Medical Director, Hot Springs, Ark.

MY DEAR SIR: I have your letter of March 16 asking my opinion as to the desirability of an experimental study of the effects of the hot springs water upon animals and human beings.

I regard it of the greatest importance to have such problems taken up if they can be properly studied. Tradition is the chief evidence

that we have as a rule, and when some attempt has been made to investigate such questions it is too frequently not completed. As a requisite for conclusive results I think the subjects should be under control as to their diet, hours, etc. Lacking this I do not think very definite results can be obtained. I believe the matter should be taken up from both the clinical and physiological sides. From the latter I should like to see a thorough investigation made of the effects of the water upon metabolism, such as possible modification of amounts of excreted materials, urea, uric acid, ammonia, creatinin, total nitrogen, compounds of sulphur, phosphorus, etc.

I hope that you may be successful in being able to take up the work.

Yours, very truly,

E. W. Rockwood.

Department of the Interior,
Hot Springs Reservation,
Office of Medical Director,
Hot Springs, Ark., March 25, 1912.

Prof. Elbert W. Rockwood,
Department of Chemistry, State University of Iowa,
Iowa City, Iowa.

Dear Prof. Rockwood: I beg to acknowledge your letter of March 18, 1912, and to express herewith my appreciation of the consideration you have given to my inquiries.

All of the correspondence with reference to the proposed investigation will be forwarded to the Secretary of the Interior in due time and I am sure that the officials of the department in Washington will appreciate your courtesy as much as I do.

Very respectfully,

Harry M. Hallock,
Medical Director.

Chicago, *March 20, 1912.*

Harry M. Hallock,
Medical Director, Hot Springs Reservation,
Hot Springs, Ark.

Sir: I have your letter of March 16, 1912, containing a statement of the governmental control of Hot Springs Reservation and also your report to the Secretary of the Interior for 1911 and a copy of the publications on the hot springs of Arkansas.

I think that further investigations, biochemical and clinical, should be made of the waters of Hot Springs, Ark. In my opinion the subject is a legitimate one and a proper one for scientific research for the purpose of making more practical the uses of the waters for patients.

I wish that it were possible for the Government to more fully control the uses of the waters by patients. If it were possible for the Government to cut out all outsiders and to conduct the bathing pavilions under complete governmental control, I believe it would remove many of the objections which now exist there.

I appreciate very much what the Government has already done through the officials to remove and correct as far as possible the former abuses which came through private interests of all kinds.

Very truly, yours,

FRANK BILLINGS.

NOTE.—Frank Billings, dean Northwestern University Medical School; professor of practice of medicine, Rush Medical College; professor of medicine, University of Chicago.

CHICAGO, *March 19, 1912.*

Mr. HARRY M. HALLOCK,
Medical Director, Hot Springs, Ark.

MY DEAR SIR: I strongly urge that tests be made to determine the chemical, thermal, and radioactive variations of the waters of Hot Springs, Ark., for this is knowledge which the medical profession needs. More than that, I urge that a physiologist of experience be given facilities for determining the effects produced by the spring water when taken internally and when used for bathing. Unless the profession has this knowledge, the water can not be used in a scientific way. Something is known of its usefulness, but it is prescribed empirically not because it is known why it should be used.

I hope the United States Government will make these investigations. Not only will they be valuable for the development of the usefulness of this spring, but doubtless much will be learned which will be useful in applying other spring waters.

Very respectfully, yours, N. S. DAVIS.

NOTE.—Nathan S. Davis, A. M., M. D., professor of principles and practice of medicine, Northwestern University, Chicago, Ill.; ex-president Chicago Medico-Legal Society; member American Medical and American Climatological Associations, etc.

ROCKEFELLER INSTITUTE FOR MEDICAL RESEARCH,
New York, March 27, 1912.

Dr. HARRY M. HALLOCK,
Medical Director, Hot Springs Reservation,
Hot Springs, Ark.

DEAR SIR: Your letter of March 16, with the printed matter, was forwarded to me. I should be glad to be of assistance to you, but I know so little about the effects of springs on health that I am not in a position to make a definite statement or recommendation.

Thanking you for your note, I remain,

Yours, very truly, JAMES LEE.

ALBANY, N. Y., *March 25, 1912.*

HARRY M. HALLOCK, M. D.,
Washington, D. C.

MY DEAR DOCTOR: Your letter and reports concerning hot springs of Arkansas were duly received, and, while I do not claim to have any very expert knowledge of such matters, it seems to me that there can be little doubt that such an investigation as you propose would be of the greatest value in determining in what class of cases they could

be resorted to with advantage. As in many other cases it is not possible to tell beforehand in precisely what way they may turn out to be of the greatest use.

Very truly, yours, SAML. B. WARD.

CORNELL UNIVERSITY MEDICAL COLLEGE,
New York, March 20, 1912.

Dr. HARRY M. HALLOCK,
Medical Director, Hot Springs, Ark.

DEAR SIR: Replying to your note of March 16 regarding the possible value of careful investigations with regard to the value of the baths of Hot Springs, Ark., I would say that I heartily approve of the idea. Of course the value of such work would depend upon the training of the head chemist who had the matter in charge. There is so much that is published nowadays which is not properly controlled that it would be a great misfortune unless the work were conducted by a man whose knowledge of the problems to be attacked was of the most thorough and fundamental order. The recent work in Germany with regard to the value of radium emanations upon the destruction of uric acid in the body is of great suggestiveness, and it would be well if similar work could be done in this conutry, if placed in the hands of competent observers.

Very truly, yours, GRAHAM LUSK.

NOTE.—Graham Lusk, Ph. D., Sc. D., F. R. S. (Edin.), professor of physiology, Cornell University Medical College.

AMERICAN MEDICAL ASSOCIATION,
COUNCIL ON PHARMACY AND CHEMISTRY,
Cleveland, Ohio, March 25, 1912.

Dr. H. M. HALLOCK.

DEAR SIR: I have perused your letter to the council and to me, and also the printed matter, with interest. It appears to me that an investigation by a physiological chemist, working in conjunction with a medical commission, holds forth promise of considerable usefulness. This investigation might bear on the following problems: Effect on temperature; effect on metabolin; effect on excretion of water, salts, metabolites, and drugs (Hg. iodid, plumbism, etc.); effect on circulation; effect on blood.

These observations will be made on healthy and diseased subjects. Comparative experiments should be made with the hot and cooled waters, also with ordinary hot water, and with the springs and plain water taken internally.

If some such program is submitted to the prominent laboratories where biochemical researches are in progress, it might facilitate the obtaining of the properly qualified investigator.

Very truly, yours,

TORALD SOLLMANN.

BUREAU OF ANIMAL INDUSTRY,
Washington, D. C., April 1, 1912.

Director HARRY M. HALLOCK,
Hot Springs, Ark.

DEAR SIR: I have your circular dated March 16. In reply to your question "Is a biochemical investigation * * * of the waters * * * a legitimate and proper one for scientific research from the standpoint of clinical medicine?" I beg to answer, in spite of my limited knowledge of the physiological effects of radium and its products, yes; provided, however, that those who are in charge of the investigations realize that the most skillful physiological chemist working for a few years probably will not get results that will appeal strongly to anyone except scientists interested in just that line. I mean that I doubt whether practical results can justly be expected from one man working a few years. I believe that before results of a direct clinical value are obtained many men will have worked for many years.

If a biological chemist were engaged in research at the hot springs, a very grave injustice might be done to him if he were regarded as incompetent because "practical results" were not forthcoming. I believe that the work should certainly be done—the more biochemists, the better—but let there be no expectation of anything definite for about 10 years. This is not too long. I used radium bromid (and barium bromid) in some metabolism experiments on dogs, and one of the results was to point out the endless labor and difficulty involved in working out the physiological and pharmacological action of a substance like radium or its allied products.

Permit me to emphasize the desirability of the work and the length of time it will probably take to arrive at results that are of "practical value."

Respectfully, WILLIAM W. BERG.

APRIL 2, 1912.

DR. HARRY M. HALLOCK,

MY DEAR DOCTOR: I most heartily indorse the efforts you are making to have tested the therapeutic value of the waters on the reservation. There seems every reason for believing that these waters will prove as beneficial, if not more so, than those in European countries.

If I can aid you in securing the necessary appropriation by speaking to a few Members of Congress I will cheerfully undertake the task.

Very truly,

SAMUEL S. ADAMS,
Georgetown University.

NOTE.—Samuel S. Adams, A. M., M. D., professor of theory and practice of medicine and diseases of children, Georgetown University.

UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF PLANT INDUSTRY,
Washington, D. C., March 20, 1912.

Dr. HARRY M. HALLOCK,
Hot Springs, Ark.

DEAR SIR: I beg to acknowledge the receipt of your letter of March 16, together with the inclosures. I will give the matter my very best consideration and will communicate with you again as soon as I have opportunity to read the literature you sent me and to consider the whole question. I hope that you can give me a few days in which to turn the matter over in my mind. It is certainly of such importance as to warrant earnest thought. Moreover, while I am familiar with the literature of radioactivity in a general way, I wish to refresh my memory by reading again some of the recent work on the subject. In that way I hope I will be able to give you an opinion that will be worth more than if I should reply to your question at once. If, however, it is necessary for me to reply at once please do not hesitate to say so and I will do what I can under the circumstances. You will then hear from me again in the course of some days.

Very truly, yours,

CARL L. ALSBERG,
Chemical Biologist.

CHICAGO, *April 6, 1912.*

Dr. H. M. HALLOCK,
Hot Springs, Ark.

MY DEAR DR. HALLOCK: In answer to your circular letter of March 15 regarding the scientific investigation of natural mineral waters, I would say that such investigations under Government supervision would undoubtedly be of enormous value to the people of this country, and that the value would gain in importance by having the work conducted jointly by the Government and a committee of the American Medical Association, because this would insure the transmission of such results directly to the entire medical profession and through them to the public.

Yours, very sincerely,

A. J. OCHSNER,
Professor Clinical Surgery of the Medical Department of the University of Illinois.

NEW YORK, *April 4, 1912.*

HARRY M. HALLOCK, M. D.,
Medical Director, Hot Springs Reservation,
Hot Springs, Ark.

DEAR DOCTOR: Please accept my thanks and appreciation of your letter of March 14 and my apologies for the delay in answering the same.

I have been greatly interested to hear of the plan of instituting investigations of the physiological effects of the waters of hot springs. It is not so very long that attention has been directed to the radioactive qualities of European mineral springs, and the study of the

subject is far from completed. Therefore there seems to be no doubt that biochemical investigation, conducted by competent observers, of the action of the waters of hot springs upon animals and upon human beings, both the sick and the well, at the springs, would result in the production of valuable scientific information beneficial to the medical profession in general and indirectly to suffering humanity. Such investigations conducted by officers of the United States Government would command attention in this country as well as abroad, and would certainly be welcomed from the clinical standpoint.

American mineral springs have heretofore been woefully neglected by the medical profession as well as by the American people. Meeting the request of the committee on therapeutic research of the American Medical Association for an investigation of the radioactivity of the various mineral waters, the plan indicated in your letter would undoubtedly be welcomed and supported by the physicians of the entire country and largely contribute to a more general appreciation of our domestic watering places.

Under these circumstances it is to be hoped that Congress will make a sufficiently large appropriation for the purposes of such an investigation.

Very truly, yours, HERMAN G. KLOTZ, M. D.

UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
Washington, D. C., April 11, 1912.

DR. H. M. HALLOCK,
Hot Springs Reservation, Hot Springs, Ark.

DEAR SIR: I have your letter of March 16 concerning the physiological effects of the water of Hot Springs, Ark.

I am interested in what you write and believe that if the matter can be arranged satisfactorily a thorough investigation of the physiological effects of the waters would be of value. I have shown your letter to Prof. R. B. Moore, recently of Butler College, Indianapolis, and now of this bureau, who has published some work on the radioactivity of waters of this country, and he informs me that he is quite well acquainted with the work you quote of Prof. B. B. Boltwood, and that the statement No. 3, "The tufa deposited by the springs does not contain appreciable traces of radium," is not correct. At the time that Prof. Boltwood did this work the methods of detecting small quantities of radium were not as far advanced as they are at the present time. Prof. Boltwood's work on the radioactivity of the waters is reliable, but more recent investigations of the tufa by Prof. Schlundt, of the University of Missouri, has disclosed the fact that some of the tufa is exceedingly active; in fact, in one case the sediment in a spring is one of the most radioactive in the whole world. Therefore, before drawing any conclusions regarding the therapeutic value of the waters, it might be advisable to have the investigation as regards the radioactivity still further extended.

Mr. Moore is now in the Government service in connection with the Bureau of Soils. I am sure he will be glad to give you any advice or suggestions that you may desire in connection with this matter or in connection with the resolution adopted by the medical associa-

tion at Los Angeles that the Government take up the investigation of the radioactivity of the various mineral waters of the United States.

Yours, very truly,

OSWALD SCHREINER,
In Charge.

NEW YORK UNIVERSITY,
UNIVERSITY AND BELLEVUE HOSPITAL MEDICAL COLLEGE,
New York City, April 17, 1912.

HARRY M. HALLOCK, M. D.,
Medical Director, Hot Springs Reservation,
Hot Springs, Ark.

DEAR SIR: Your circular letter addressed to me at the Albany Medical College was forwarded to me at my present address above.

I deem it extremely wise and would recommend by all means that an investigation as to the therapeutic value of the waters at the hot springs be made with scientific accuracy and under competent supervision.

The exploitation of so many spas where remedial waters are dispensed at high cost both for services and living has had its effect upon the profession as well as the laity, and it is therefore, above all things, highly necessary that you become able to present scientific proof of the functional efficacy of the spring water.

It would be impossible to give you an outline of a possible line of procedure, for that would entail months of study into the conditions of climate, composition of water, methods of ingestion, physiological effects, etc.

I can simply call your attention to the importance which has quite recently been emphasized from various standpoints of the equilibrium of salts which must exist and be held constant in the full-grown individual and the abnormalities of function which result from any disturbance of this equilibrium. Also the importance of certain salts, such as potassium compounds, for the proper growth of the young. All this is apart from the question of the therapeusis of radioactive substances. Any data which you may obtain in any of these fields will be of great value to the medical profession and would result in increased cooperation on their part.

Very truly,

HOLMES C. JACKSON.

P. S.—If you are actually anxious for details in any specific matter I shall be glad to supply them.

COLLEGE OF MEDICINE OF SYRACUSE UNIVERSITY,
Syracuse, N. Y., April 18, 1912.

Dr. HARRY M. HALLOCK,
Medical Director, Hot Springs Reservation,
Hot Springs, Ark.

DEAR SIR: Your letter of March 16, addressed to Dean Heffron, has been handed to me, with the request that I make a reply. I am in hearty sympathy with any attempt which leads to estimating the

exact physiological effects of the water at Hot Springs. I believe that you are to be congratulated because of the fact that the Government is taking hold of this spa, and I consider it one of the duties of the Government to not only make the springs accessible to the people, but to so study them that the baths and water will be used only in a perfectly proper way.

Very truly, yours,

W. D. ALSEVER,
Professor of Therapeutics.

THE UNIVERSITY OF WISCONSIN,
DEPARTMENT OF PHARMACOLOGY AND TOXICOLOGY,
Madison, Wis., April 24, 1912.

DR. HARRY M. HALLOCK,
Medical Director, Hot Springs, Ark.

DEAR SIR: Due to serious illness in my family and my absence from the city, I have been unable to answer your letter earlier. I think a thorough study of the physiological effects of the water of hot springs and a determination of its therapeutic value would be very desirable. I can not make any recommendations "As to the best method of procedure," because I do not understand what you mean by this phrase. Scientifically, the work should determine the effect of the water on metabolism in health and disease, and physiological investigations of various kinds should determine the effect in detail of the water on the circulation and respiration in health and disease.

Yours, very truly,

A. S. LOEVENHART.

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